DEPARTMENT OF THE INTERIOR

ENVIRONMENTAL IMPACT STATEMENT

PROPOSED

1981 OUTER CONTINENTAL SHELF OIL AND GAS

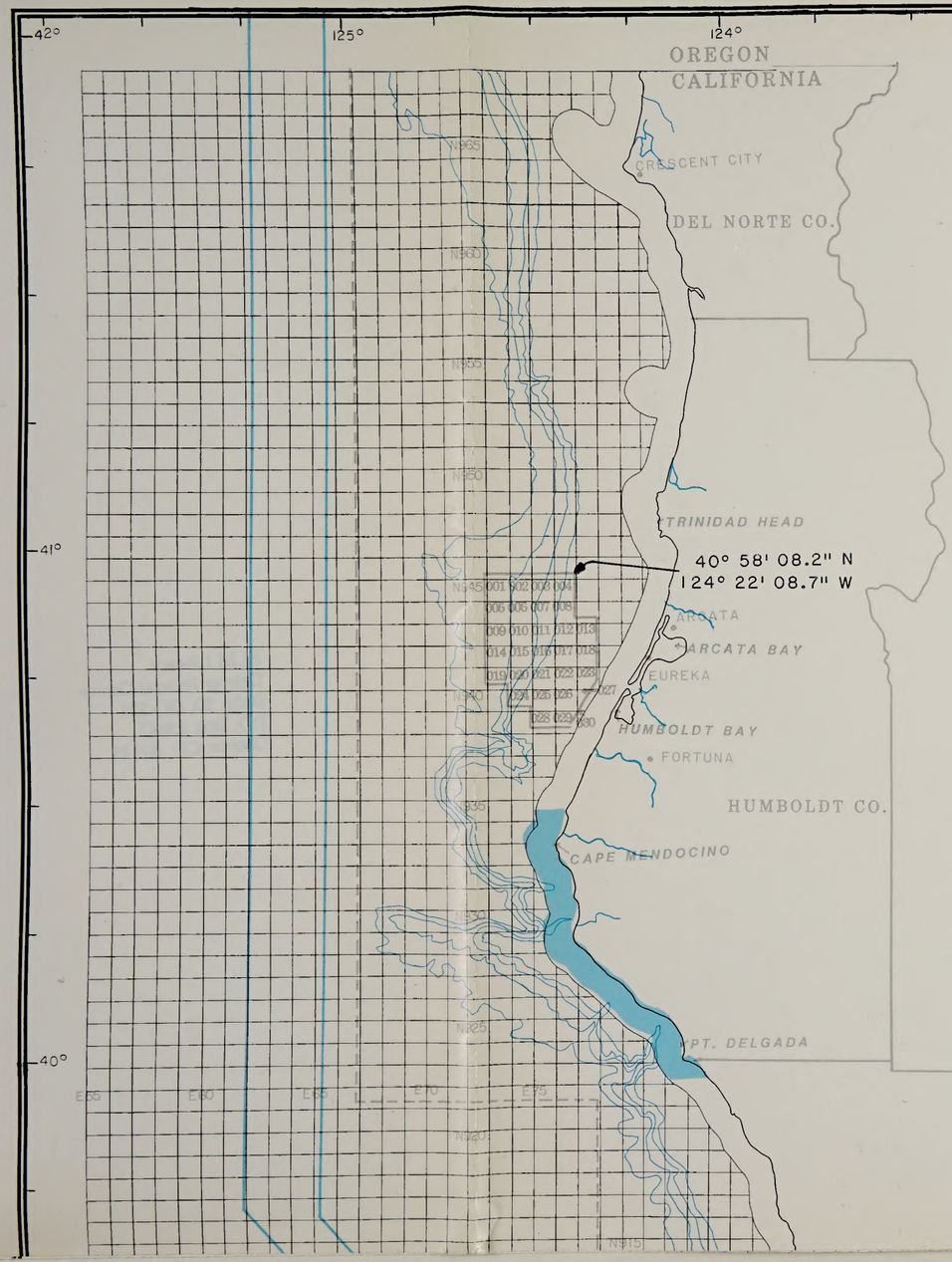
LEASE SALE OFFSHORE CENTRAL AND NORTHERN CALIFORNIA

OCS SALE NO. 53 VOLUME 2 OF 2

(14 maps enclosed, including Visual Errata Sheets)

Prepared by

Bureau of Land Management
Dept. of the Interior



UNITED STATES DEPARTMENT OF THE INTERIOR

BUREAU OF LAND MANAGEMENT PACIFIC O.C.S. OFFICE

ENVIRONMENTAL IMPACT STATEMENT LEASE SALE NO. 53

OFFSHORE CENTRAL AND NORTHERN CALIFORNIA

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Onshore planimetric base compilation is from the National Topographic Map 1:250,000 series with the coastline revised to agree with current official nautical charts.

PREPARED: 11/24/78

5 0 5 10 NAUTICAL MILES

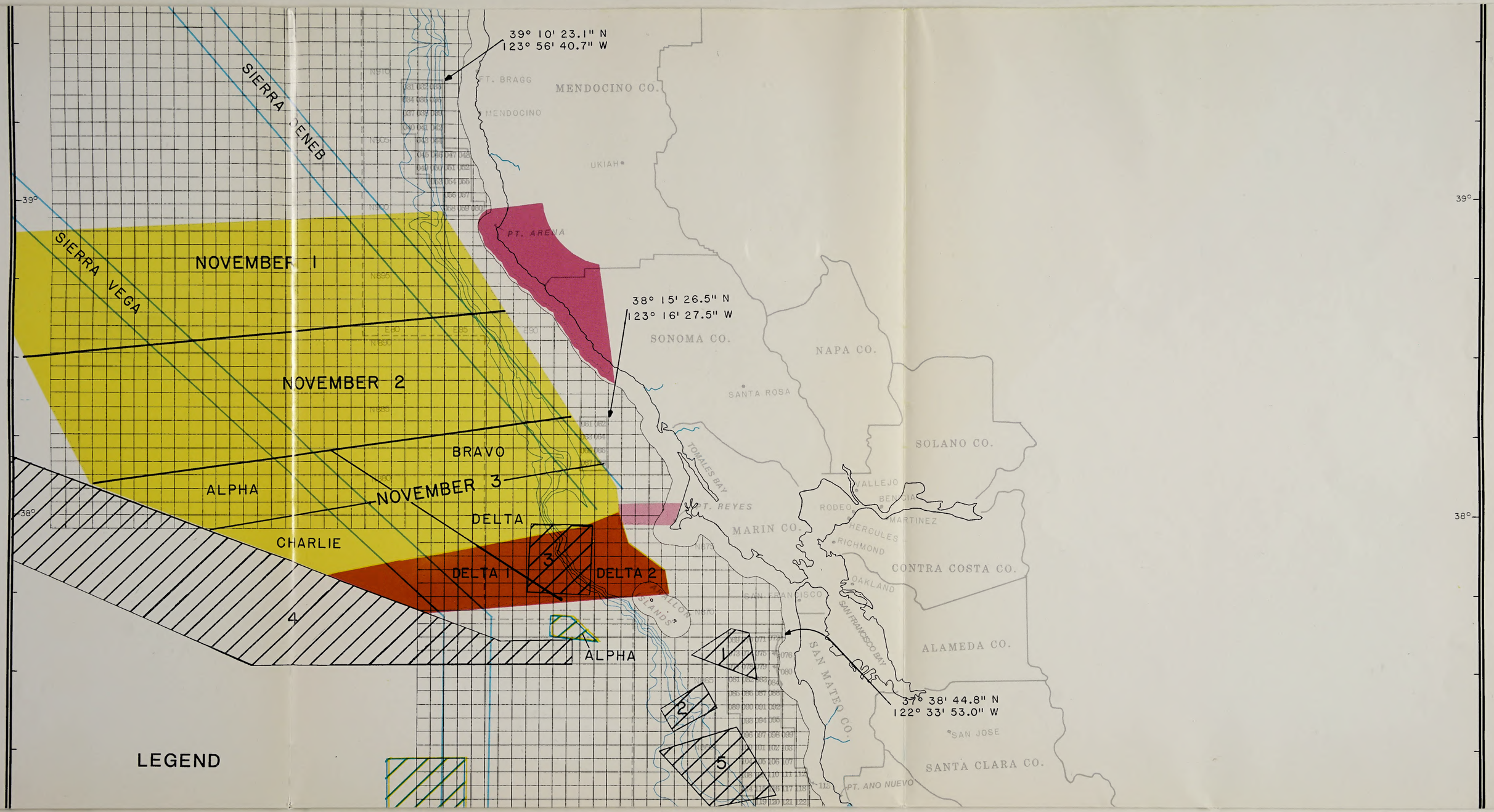
5 0 5 10 15 20 25 30 KILOMETERS

5 0 5 10 15 20 STATUTE MILES

This visual graphic has been carefully prepared from existing sources. However, the Bureau of Land Management, U.S.D.I. does not guarantee the accuracy to the extent of responsibility of liability for reliance thereon/this is a special visual graphic overprint and is not to be used for navigation purposes. Prepared by the Pacific Outer Continental Shelf Office, Los Angeles, California. William E. Grant, Manager (1979)

MILITARY OPERATING AREAS, CONFLICTS; STATE OIL AND GAS SANCTUARIES

Visual No. 1


39° 10' 23.1" N
123° 56' 40.7" W
SIERRA ENEB
SIERRA VEGA
NOVEMBER 1
NOVEMBER 2
NOVEMBER 3
ALPHA
BRAVO
CHARLIE
DELTA
DELTA 1
DELTA 2
1
2
3
4
5
ALPHA
38° 15' 26.5" N
123° 16' 27.5" W
37° 38' 44.8" N
122° 33' 53.0" W
LEGEND
MENDOCINO CO.
SONOMA CO.
NAPA CO.
SOLANO CO.
MARIN CO.
CONTRA COSTA CO.
ALAMEDA CO.
SAN MATEO CO.
SANTA CLARA CO.
PT. ARENA
PT. REYES
PT. ANO NUEVO
SAN FRANCISCO BAY
TOMALES BAY
UKIAH
SANTA ROSA
SAN JOSE
39°
38°

W260 Flight Training

W281 Flight Training

W283 Flight Training

W285 Flight Training

W513 Flight Training

W532 Flight Training
(Missiles,Bombs,ASW)

Pt. Reyes Electronic Range

Military Dumping Area

Monterey Minecraft
Operating Area

Anchor Bay MOA/ATCAAA
Flight Training

Submarine Diving Area
(Uniform)

Submarine Transit Lane

State Oil & Gas Sanctuary

BRAVO

SIERRA VENUS

SIERRA SATURN

CHARLIE

SANTA CRUZ CO.

SANTA CRUZ

MONTEREY BAY

SALINAS

MONTEREY

PT. SUR

MONTEREY CO.

SAN SIMEON PT.

35° 22' 46.8" N
120° 59' 31.2" W

PT. ESTERO

MORRO BAY

SAN LUIS OBISPO CO.

SAN LUIS OBISPO

PT. BUCHON

PISMO BEACH

PT. SAL

SANTA MARIA

SANTA BARBARA CO.

LOMPOC

PT. ARGUELLO

PT. CONCEPTION

SANTA BARBARA CHANNEL

SAN MIGUEL IS.

SANTA ROSA IS.

37°

36°

35°

34°

125°

124°

123°

122°

121°

120°

BASINS OF NORTHERN AND CENTRAL CALIFORNIA

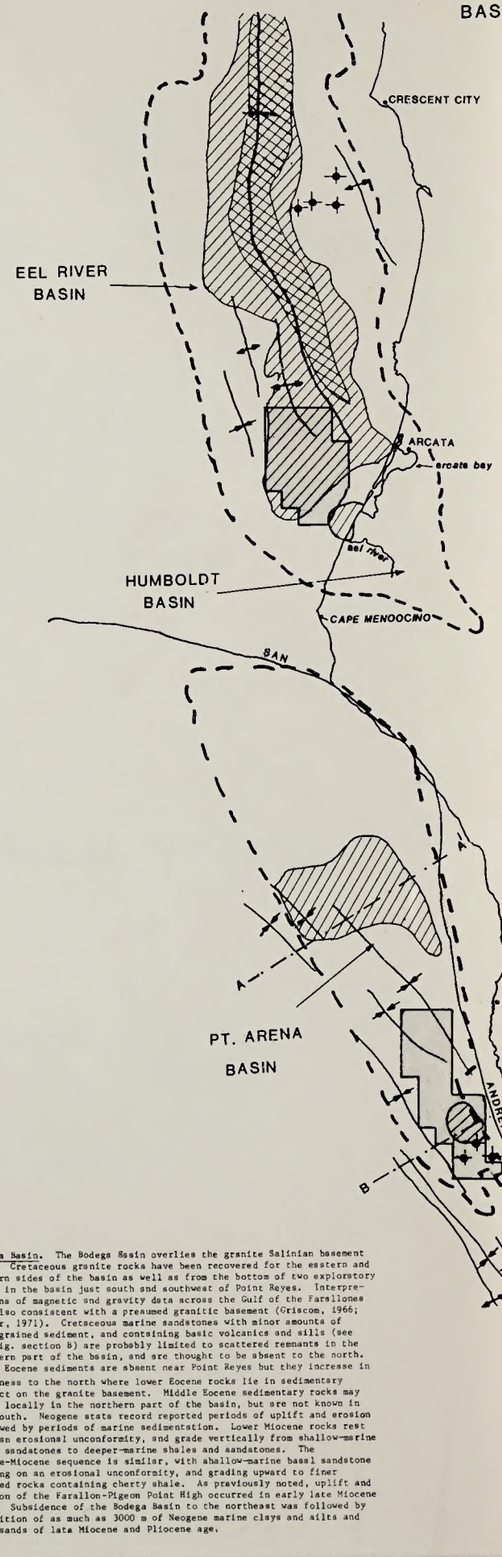
Visual Errata Sheet No. 1

127 126 125 124 123 122 121 120

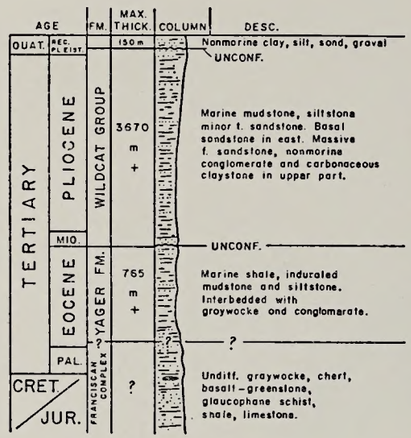
41 40 39 38

LEGEND

- Areas With 5,000' To 10,000' Of Neogene Sedimentry
- Areas With >10,000' Of Neogene Sedimentry
- Structural Highs
- Nominated Sale #53 Lease Area
- Exploratory Wells
- Basin Limits
- Major Structural Axis
- Cross Section



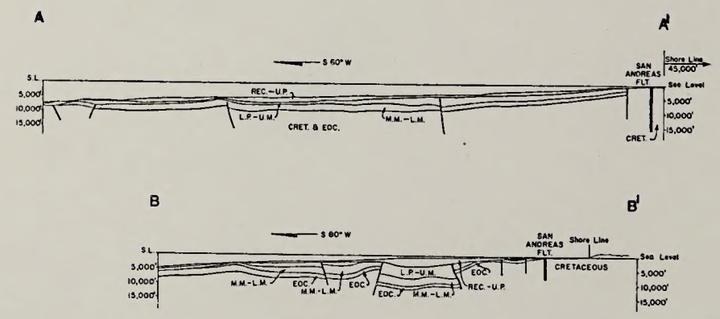
EEL RIVER BASIN
STRATIGRAPHIC COLUMN



Eel River. Basement rocks in the onshore Eel River Basin are mostly massive graywacke with some chert, basalt-greenstone, shale, limestone and schist assigned to the coastal and central belts of the Franciscan complex of Berkland, et al., (1972) of Late Jurassic to Eocene age (Figure 14). This eugeosynclinal assemblage probably underlies the basin offshore as well. The Yager Formation, Eocene in age (Evitt and Pierce, 1975), is in fault contact with Franciscan basement rocks of the central belt in the lower Eel River area, but depositionally overlies relatively young (upper Cretaceous-Eocene) rocks of the coastal belt a short distance to the southwest (Ogle, 1953; Irwin, 1960). It is at least 765 m (2500 feet) and perhaps as much as 3060 m (10,000 feet) thick, and consists of dense, well-indurated mudstone, siltstone, and shale, with lesser graywacke and conglomerate containing locally-derived Franciscan detritus (Ogle, 1953).

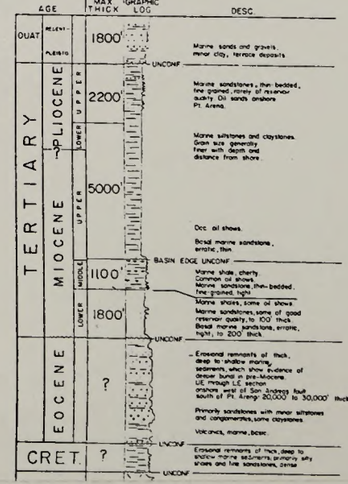
Regional deformation occurred between Eocene and middle Miocene time, and Neogene strata unconformably overlie Eocene and older rocks in the Eel River basin both onshore and offshore (Ogle, 1953; Hoskins and Griffiths, 1971). The Wildcat Group comprises an essentially conformable sequence of mostly marine late Miocene to Pleistocene strata about 3670 m (12,000 feet thick (Ogle, 1953). Predominant lithologies are weakly consolidated mudstone, siltstone and claystone, with subordinate amounts of sandstone and conglomerate, and minor lignite and tuff. Units of this group appear to record a northward transgression over basement during late Miocene, followed by alternate deepening and shallowing of the basin, a marine regression during late Pliocene and, finally, by emergence and marginal marine and non-marine deposition in late Pliocene and Pleistocene time. Episodic marginal uplifts are indicated by coarse Franciscan debris and conglomerates of Pliocene mudstone fragments in some units, and by local unconformities within the group (Ogle, 1953). The section coarsens upward, reflecting late Pliocene regression, and eastward, reflecting the presence of a landmass nearby. Similar, predominantly shallow-marine, strata that are approximately correlative with the Wildcat Group are preserved in a graben located about 16 km (10 mi) to the north (Manning and Ogle, 1950), and in the Crescent City area (Back, 1957).

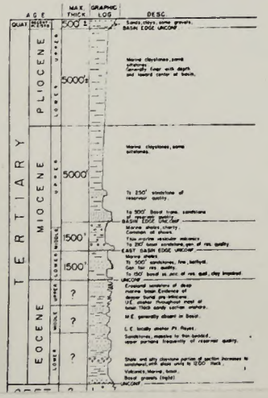
The close of Wildcat deposition was marked by basin margin warping and uplift that continued into Pleistocene time, culminating in basinwide deformation that followed older structural trends (Ogle, 1953). Pleistocene and Holocene clays, sands, silts and gravels unconformably overlie Wildcat strata in onshore parts of the basin. These deposits have an aggregate thickness of about 150 m (500 feet) and were deposited in shallow-marine and coastal plain environments. As in the Wildcat Group, the marine section becomes finer grained northwestward, suggesting that the basin deepened in that direction.

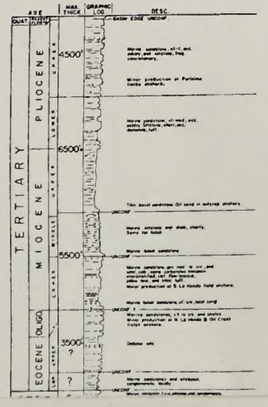


Point Arena Basin. The basin is reported to be underlain partly by pre-Cretaceous (Jurassic?) metasediments (Hoskins and Griffiths, 1971. Thick sections of Cretaceous shallow water marine shale, siltstone and fine-grained sandstones crop out on shore to the south, but they thin abruptly to the north in the basin, probably as the result of pre-Eocene erosion. Eocene sediments also thin abruptly to the north in the basin, and are also truncated by an erosional unconformity below lower Miocene strata. Onshore to the south there is a thick section of lower to upper Eocene sandstone and shale, suggesting that if a comparable section existed on the shelf, it was largely removed by the late Paleogene-early Neogene erosion. Lower Miocene deep water marine shales containing a thick but discontinuous basal sandstone rest on the unconformity, recording a transgression and subsequent deep marine deposition. As in the basins to the south, the following middle Miocene is represented by cherty shale. A lower upper Miocene basal marine sandstone rests unconformably on older sediments near Point Arena, but over most of the basin there appears to have been no break between middle and upper Miocene sedimentation. Upper Miocene marine siltstones and claystones grade upward into upper Pliocene marine sandstones, which in turn are truncated by an unconformity at the base of the coarser Pleistocene section.

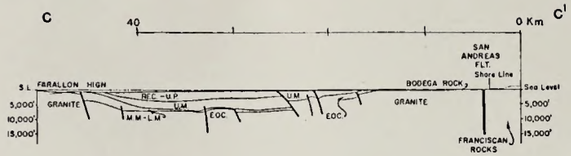
POINT ARENA "BASIN"
STRATIGRAPHIC COLUMN



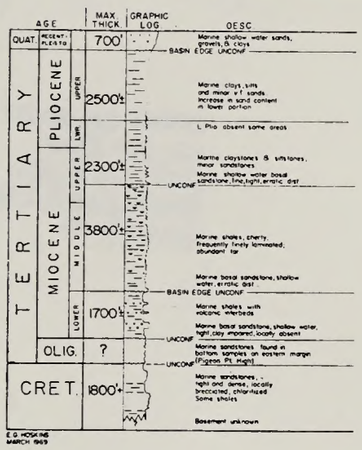




Bodega Basin. The Bodega Basin overlies the granite Salinian basement rock. Cretaceous granite rocks have been recovered for the eastern and western sides of the basin as well as from the bottom of two exploratory wells in the basin just south and southwest of Point Reyes. Interpretations of magnetic and gravity data across the Gulf of the Farallones are also consistent with a presumed granitic basement (Griscom, 1966; Cooper, 1971). Cretaceous marine sandstones with minor amounts of fine-grained sediment, and containing basic volcanics and sills (see stratig. section B) are probably limited to scattered remnants in the southern part of the basin, and are thought to be absent to the north. Lower Eocene sediments are absent near Point Reyes but they increase in thickness to the north where lower Eocene rocks lie in sedimentary contact on the granite basement. Middle Eocene sedimentary rocks may occur locally in the northern part of the basin, but are not known in the south. Neogene stats record reported periods of uplift and erosion followed by periods of marine sedimentation. Lower Miocene rocks rest upon an erosional unconformity, and grade vertically from shallow-marine basal sandstones to deeper-marine shales and sandstones. The middle-Miocene sequence is similar, with shallow-marine basal sandstone resting on an erosional unconformity, and grading upward to finer grained rocks containing cherty shale. As previously noted, uplift and erosion of the Farallon-Pigeon Point High occurred in early late Miocene time. Subsidence of the Bodega Basin to the northeast was followed by deposition of as much as 3000 m of Neogene marine clays and silts and some sands of late Miocene and Pliocene age.

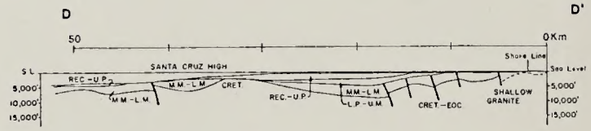


OUTER SANTA CRUZ BASIN
STRATIGRAPHIC COLUMN

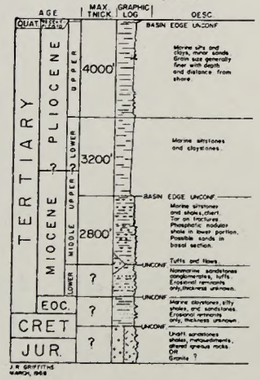


E.G. HOSKINS
MARCH 1969

Outer Santa Cruz Basin. Cretaceous and early Tertiary (Oligocene ?) marine sandstone are present locally beneath the basin but their general distribution is not known (Hoskins and Griffiths, 1971). Both the Cretaceous and Oligocene (?) periods of deposition were followed by deformation and erosion. The overlying Neogene units suggested repeated periods of erosion followed by marine sedimentation that reflect the transition from shallow sandy to deep finer-grained deposition. Volcanics (interbedded in marine shales) are limited to the lower Neogene as in the Santa Maria Basin offshore. Cherty shales (Monterey Formation?) dominated the deposition until the early late Miocene period of deformation and erosion that accompanied the uplift of the structural highs, and the initiation of the present basin. Relatively fine-grained sediment, primarily silt and clay with a minor amount of sand, accumulated in the basin in upper Miocene and Pliocene time.



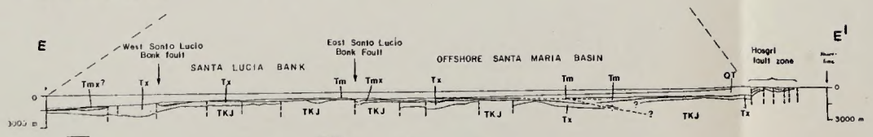
SANTA MARIA BASIN
STRATIGRAPHIC COLUMN



J.R. GRIFFITHS
MARCH, 1968

Santa Maria Offshore. Basement rocks exposed along the shore are Franciscan-Knoxville rocks of Jurrasic. Cretaceous early Tertiary (?) age. Similar rocks (metasediments, altered basic igneous rocks) have been dredged from acoustic basement on the Santa Lucia high. The structural style of the basin and granite derived coarse clastics of upper Cretaceous and Eocene age from the Santa Lucia High suggested to Hoskins and Griffith (1971) that basement may be granitic.

X-sec. Lithologies and ages inferred from the nearby single test well in the basin (Humble P-060-1). The lowest Neogene rocks (TK) may be volcaniclastic and contain a few thin flow units. The overlying acoustically thin-bedded, wedge-shaped unit (Tmx) may correlate with a volcanic tuff in the well, and may be equivalent to the onshore Obispo tuff of early and middle Miocene age (Crawford, 1971) Tmx. A well bedded unit (Tm) overlies Tmx. Samples from the Santa Lucia High indicate that these well bedded strata are middle Miocene foraminiferal siliceous shales which may in part be equivalent to the Monterey Formation. The uppermost unit (QT) reats with local unconformity on TM, and is undivided oo the section. It is composed principally of Pliocene and Pleistocene deposits, but it probably includes a minor amount of upper Miocene at its base.



QT
Quaternary and upper Pliocene sediments

Tm
Middle Miocene Monterey Fm. type rocks

Tmx
Miocene Felsic tuffs and related rocks (Obispo Tuff equivalent ?)

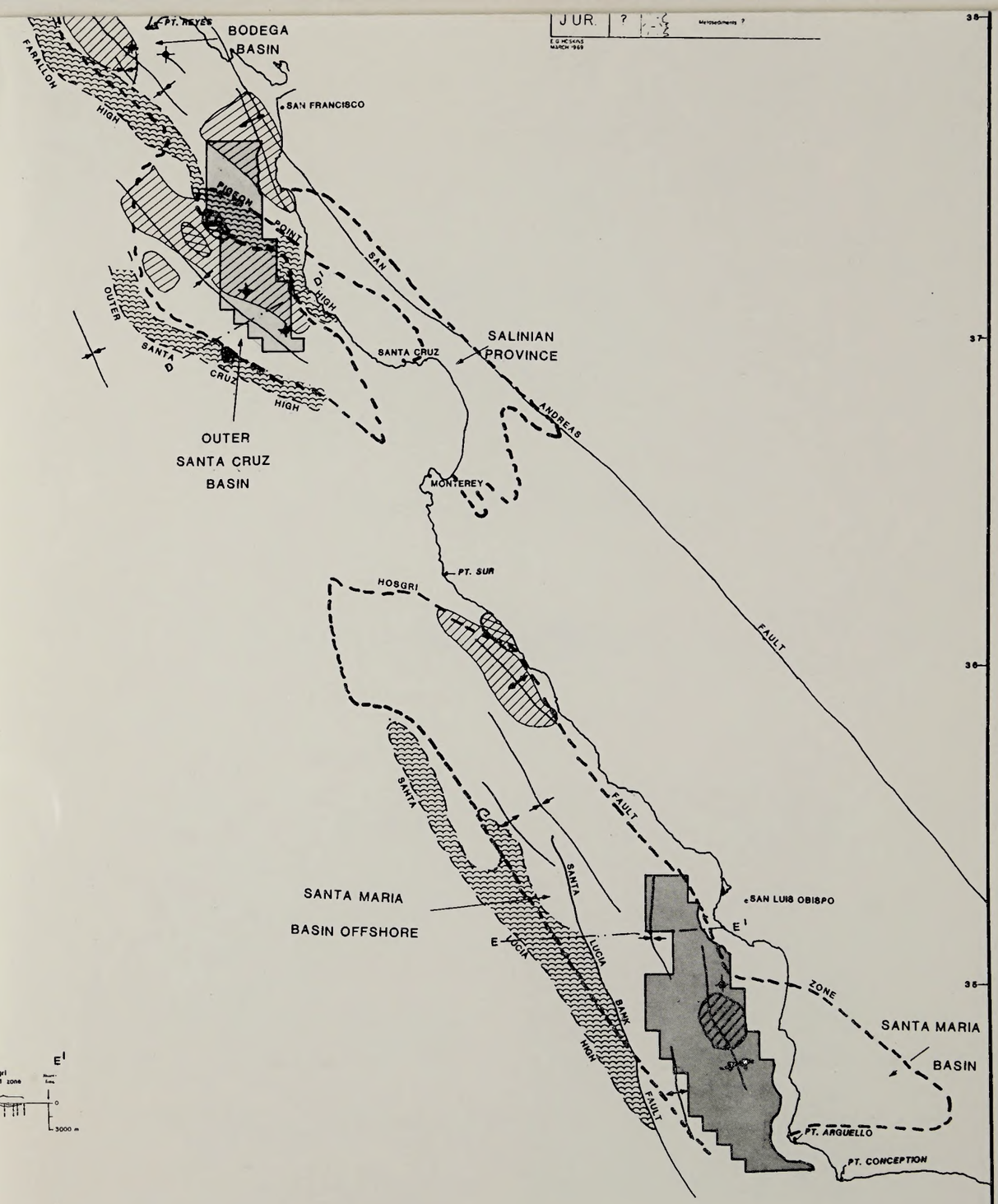
Tx
Lower Tertiary rocks unspecified offshore Nearshore are volcaniclastic and thin flows

Tkj
Franciscan and/or Cretaceous - Eocene (?) rocks

Contact

Fault

All faults, except very low-angle thrusts, are shown vertical. Exaggeration on the seismic profiles (6:1) makes faults that dip steeper than about 40° appear vertical on the profiles.



REGIONAL SECTIONS

SCALE IN MILES

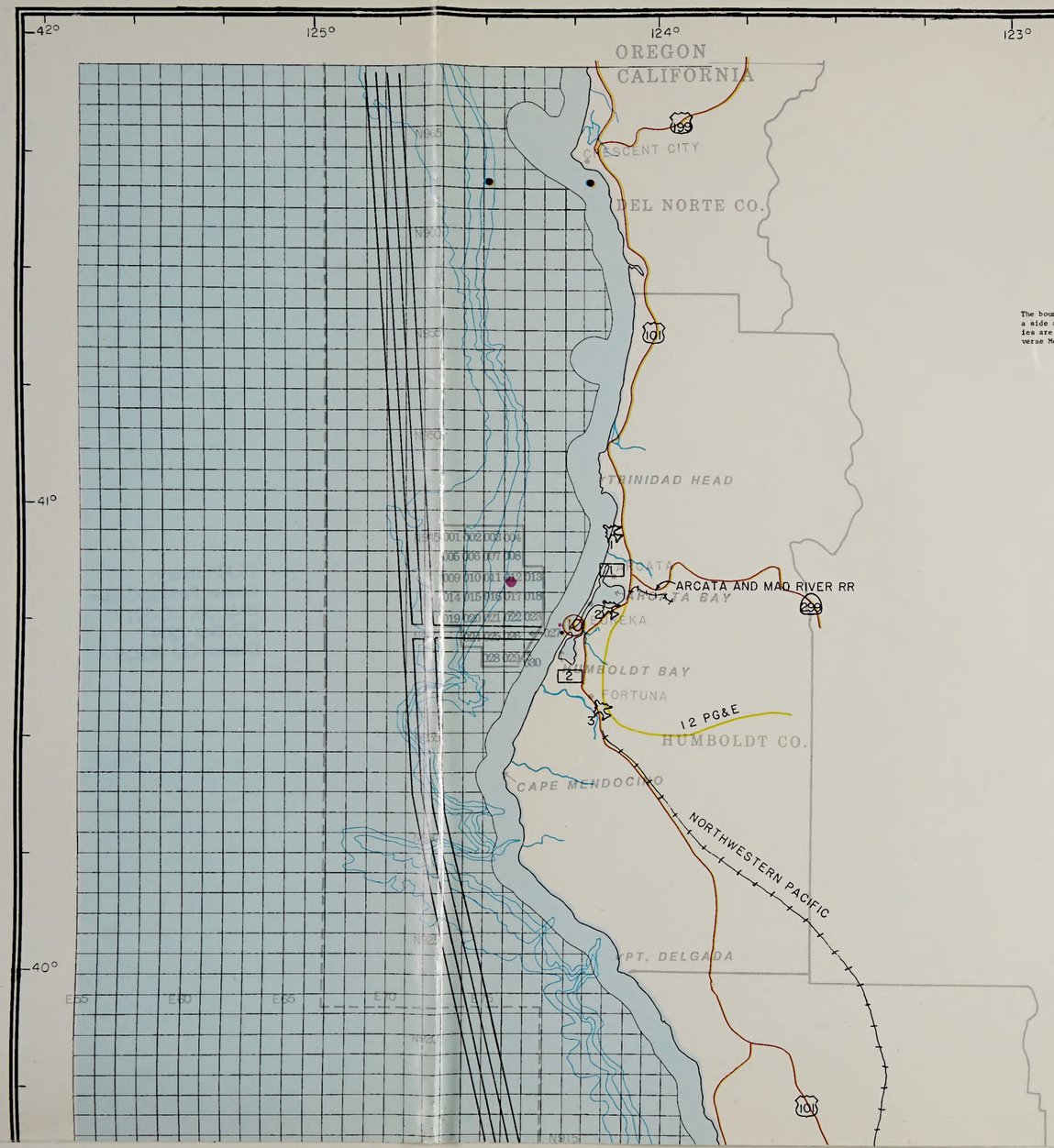
SCALE IN KILOMETERS

AUTHOR: E.G. Hoskins

FEB. 1969

EXPLANATION
REC = RECENT
U.P. = UPPER PLIOCENE
L.P. = LOWER PLIOCENE
U.M. = UPPER MIOCENE
M.M. = MIDDLE MIOCENE
L.M. = LOWER MIOCENE
EOC = EOCENE
CRET= CRETACEOUS

127 126 125 124 123 122 121 120



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ENVIRONMENTAL IMPACT STATEMENT LEASE SALE NO. 53

OFFSHORE CENTRAL AND NORTHERN CALIFORNIA

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SHIPPING LANES, PIPELINES, AND TRANSPORTATION; DUMP SITES

Visual No. 2

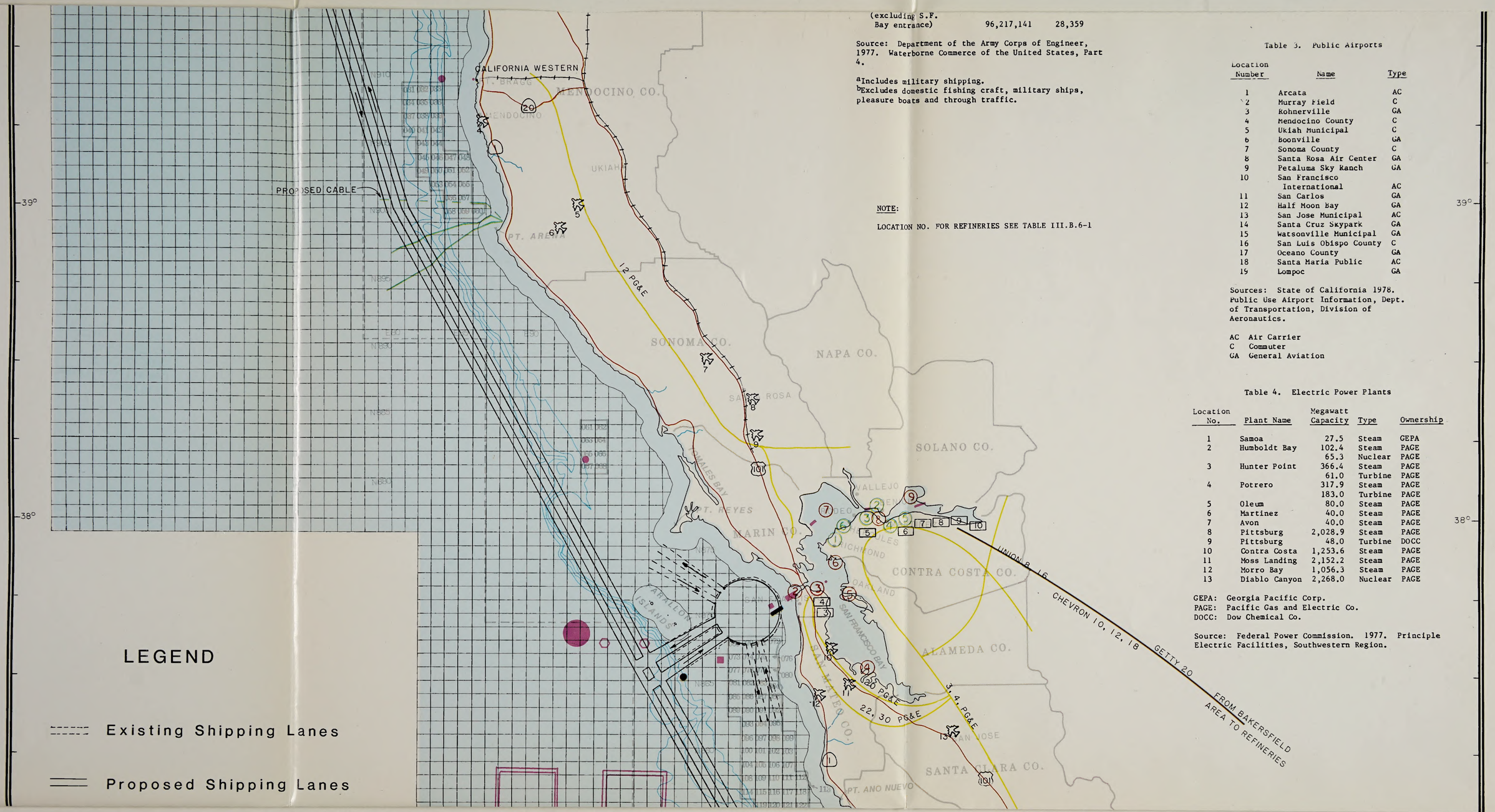
Table 1. Total Freight Traffic Point Conception to California-Oregon Border Calendar Year 1977

Location No.	Harbors	Total Waterborne[a] Tonnage (Short Ton = 2,000 Pounds)	Vessel[b] Arrivals
1	Moss Landing	2,204,350	85
2	San Francisco Bay Entrance	56,183,514	4,221
3	San Francisco	1,931,693	6,927
4	Redwood City	410,293	175
5	Oakland	6,828,938	4,992
6	Richmond	23,823,508	6,298
7	San Pablo Bay and Mare Island Strait	26,712,751	4,139
8	Carquinez Strait	24,740,631	3,668
9	Suisun Bay Channel	7,920,404	1,719
10	Humboldt Harbor and Bay	1,644,573	356
	Total		

Table 2. Conventional Buoy Mooring Marine Terminals (Central California)

Location No.	Owner	Submarine Pipeline Diameter Inches	Product		Tanker Size Max. Deadwater
1	Pacific Gas & Electric	18	Fuel Oil	Receipt	16 M
2	Chevron	18	Crude Oil	Ship	50 M
3	Chevron	18	Crude Oil	Ship	80 M
4	Pacific Gas & Electric	24	Fuel Oil	Receipt	50 M
5	United States Navy	16	Refined	Receipt	50 M
6	Texaco	2-10	Refined	Receipt	50 M
7	Union (2 mooring buoys straddles a pier)	—	Crude Oil	Ship	—

Source: U.S. Dept. of Interior Final EIS, Vol. I of II, Deepwater Ports, April 1974. Pacific Gas and Electric. 1974. Environmental Data Statement, Moss Landing Marine Terminal Expansion.



(excluding S.F. Bay entrance)	96,217,141	28,359

Source: Department of the Army Corps of Engineer, 1977. Waterborne Commerce of the United States, Part 4.

[a]Includes military shipping.
[b]Excludes domestic fishing craft, military ships, pleasure boats and through traffic.

NOTE:

LOCATION NO. FOR REFINERIES SEE TABLE III.B.6-1

Table 3. Public Airports

Location Number	Name	Type
1	Arcata	AC
2	Murray Field	C
3	Kohnerville	GA
4	Mendocino County	C
5	Ukiah Municipal	C
6	Boonville	GA
7	Sonoma County	C
8	Santa Rosa Air Center	GA
9	Petaluma Sky Ranch	GA
10	San Francisco International	AC
11	San Carlos	GA
12	Half Moon Bay	GA
13	San Jose Municipal	AC
14	Santa Cruz Skypark	GA
15	Watsonville Municipal	GA
16	San Luis Obispo County	C
17	Oceano County	GA
18	Santa Maria Public	AC
19	Lompoc	GA

Sources: State of California 1978. Public Use Airport Information, Dept. of Transportation, Division of Aeronautics.

AC Air Carrier
C Commuter
GA General Aviation

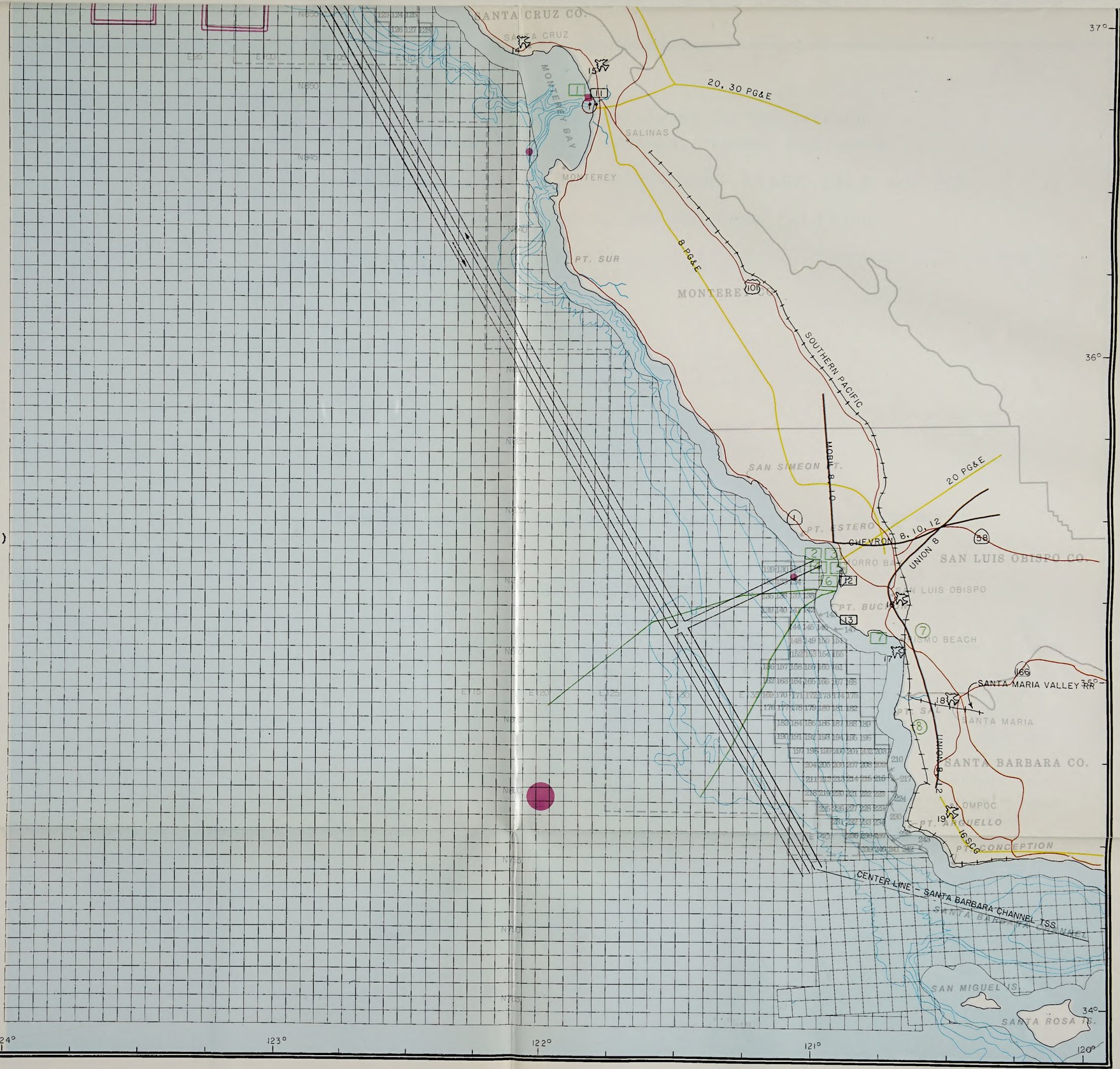
Table 4. Electric Power Plants

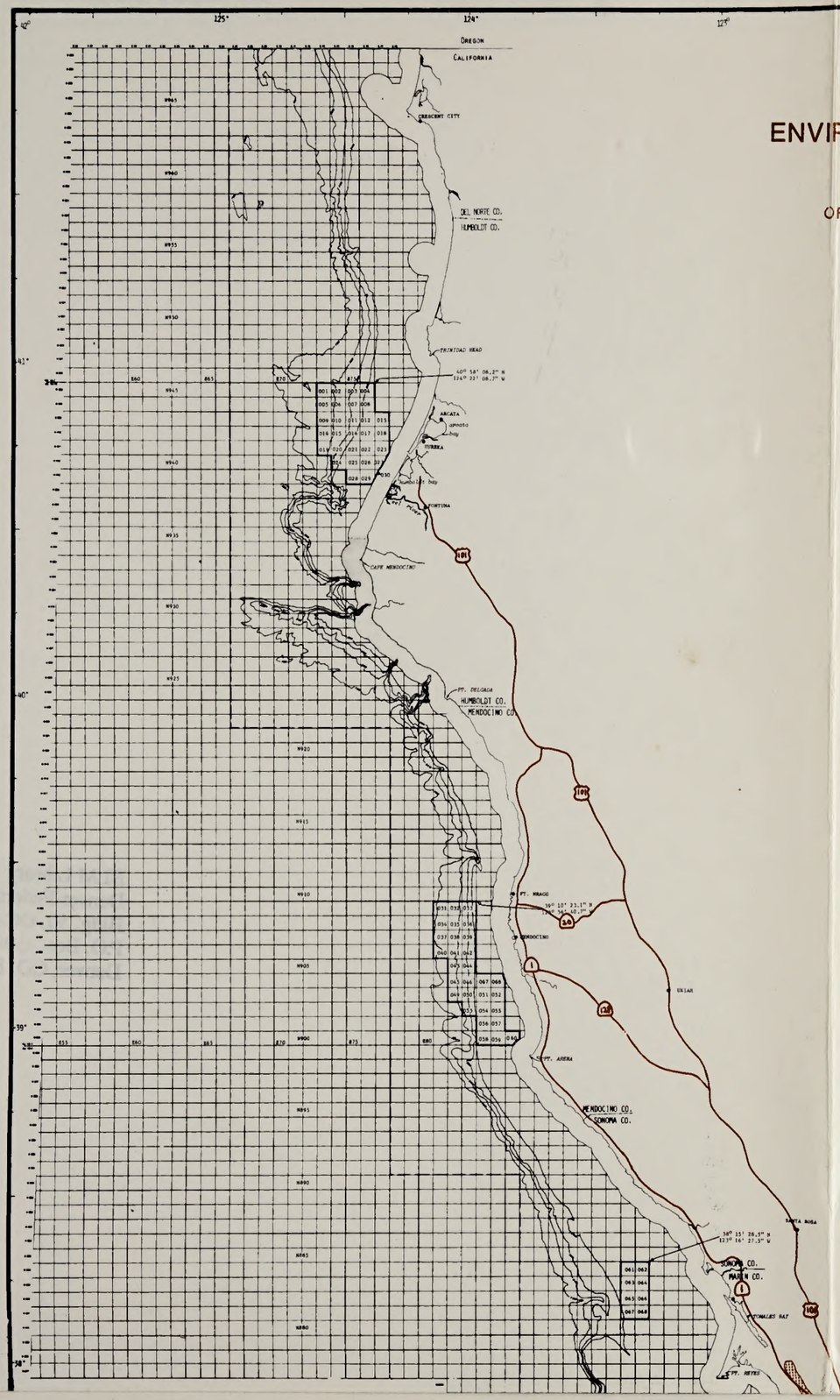
Location No.	Plant Name	Megawatt Capacity	Type	Ownership
1	Samoa	27.5	Steam	GEPA
2	Humboldt Bay	102.4	Steam	PAGE
		65.3	Nuclear	PAGE
3	Hunter Point	366.4	Steam	PAGE
		61.0	Turbine	PAGE
4	Potrero	317.9	Steam	PAGE
		183.0	Turbine	PAGE
5	Oleum	80.0	Steam	PAGE
6	Martinez	40.0	Steam	PAGE
7	Avon	40.0	Steam	PAGE
8	Pittsburg	2,028.9	Steam	PAGE
9	Pittsburg	48.0	Turbine	DOCC
10	Contra Costa	1,253.6	Steam	PAGE
11	Moss Landing	2,152.2	Steam	PAGE
12	Morro Bay	1,056.3	Steam	PAGE
13	Diablo Canyon	2,268.0	Nuclear	PAGE

GEPA: Georgia Pacific Corp.
PAGE: Pacific Gas and Electric Co.
DOCC: Dow Chemical Co.

Source: Federal Power Commission. 1977. Principle Electric Facilities, Southwestern Region.

- Highway
- Railroad
- Airport
- Marine Terminal
- Harbor
- Electric Generating Plant
- Refinery
- Crude Oil Pipeline
- Gas Pipeline
- AT&T Submarine Cable (Cal.-Hawaii)
- Active Dump Site
- Historic Dump Site
- Historic Dump Sites (Area Covered 220-250 sq. miles)
- Historic Munitions Dump Site
- *Proposed AT&T Submarine Cable*





ENVIRONMENTAL IMPACT STATEMENT

LEASE SALE No. 53

OFFSHORE CENTRAL AND NORTHERN CALIFORNIA

VISUAL ERRATA SHEET No. 2

TRANSPORTATION

RECREATION

COMMERCIAL FISHERIES

Several Corrections To Visual No. 3 (Commercial Fisheries) Were Noted In The Comments Received On The DEIS. These Corrections Have Been Incorporated In The Text Of The FEIS.

KELP Bell & Ally (1972)

Comments Received On Visual No. 5 (Kelp) Have Been Incorporated In The Text Of The FEIS.

PLANKTON Smith (1971)

Comments Received On Visual No. 6 (Plankton) Have Been Incorporated In The Text Of The FEIS.

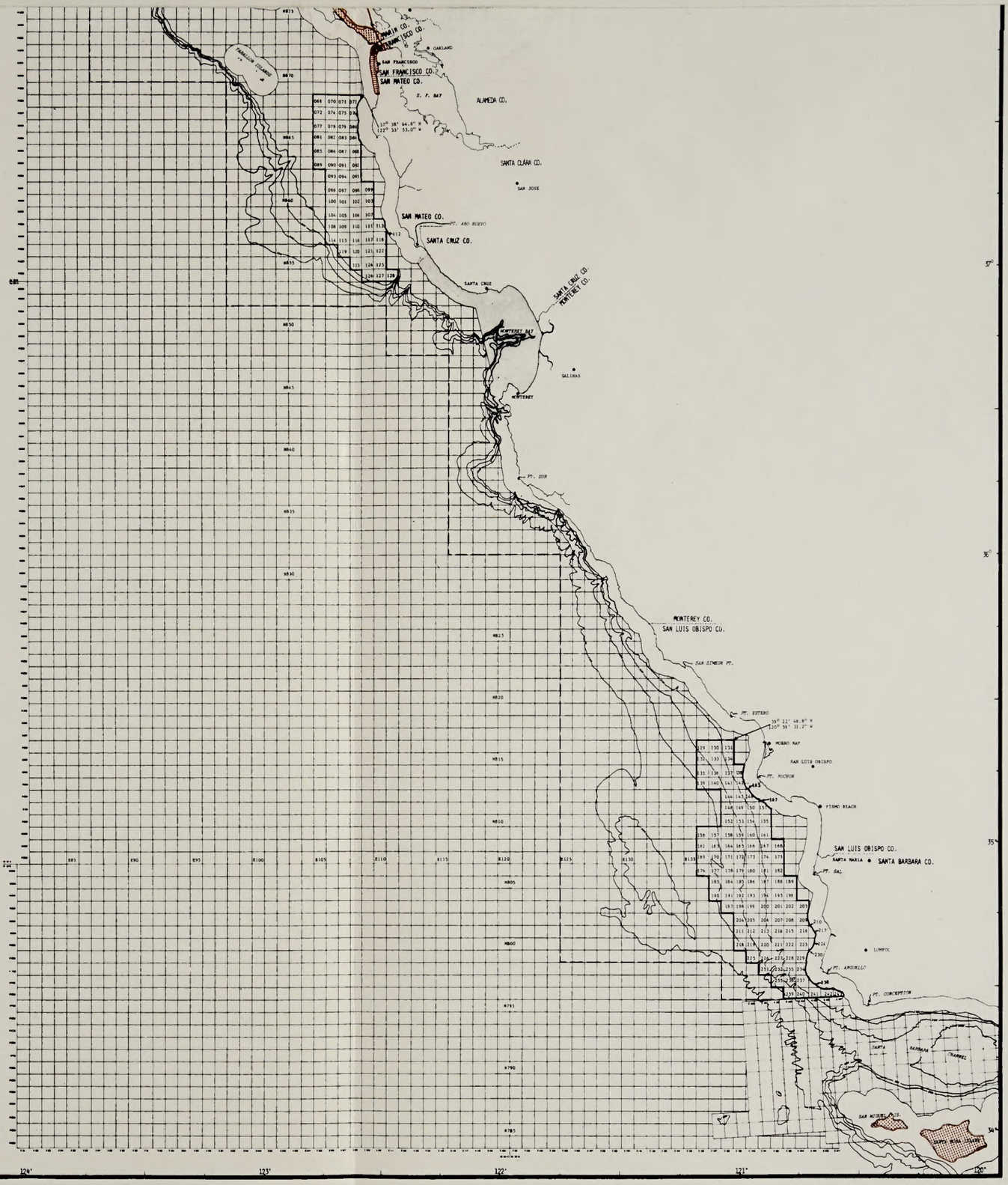
SHORELINE TYPES Dames & Moore (1971)

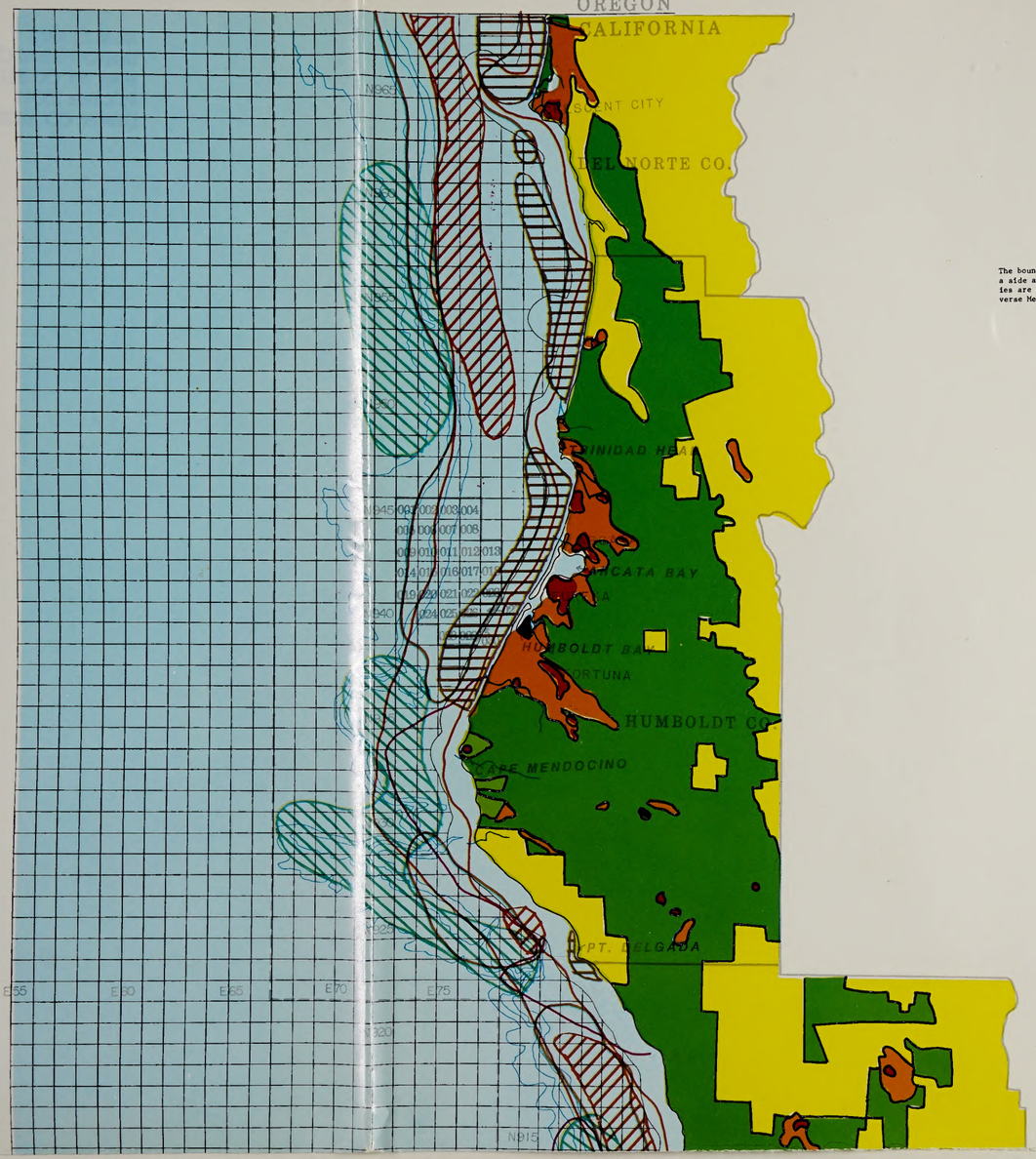
GEOLOGY

Comments Received On The Geology Visuals Have Been Incorporated In The Text Of The FEIS.

LEGEND

- Highway
- Federal Recreational Areas
- Rocky Shore
- Sandy Beach





UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT PACIFIC O.C.S. OFFICE

ENVIRONMENTAL IMPACT STATEMENT LEASE SALE NO. 53

OFFSHORE CENTRAL AND NORTHERN CALIFORNIA

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PREPARED: 11/24/78

5 0 5 10 NAUTICAL MILES

5 0 5 10 15 20 25 30 KILOMETERS

5 0 5 10 15 20 STATUTE MILES

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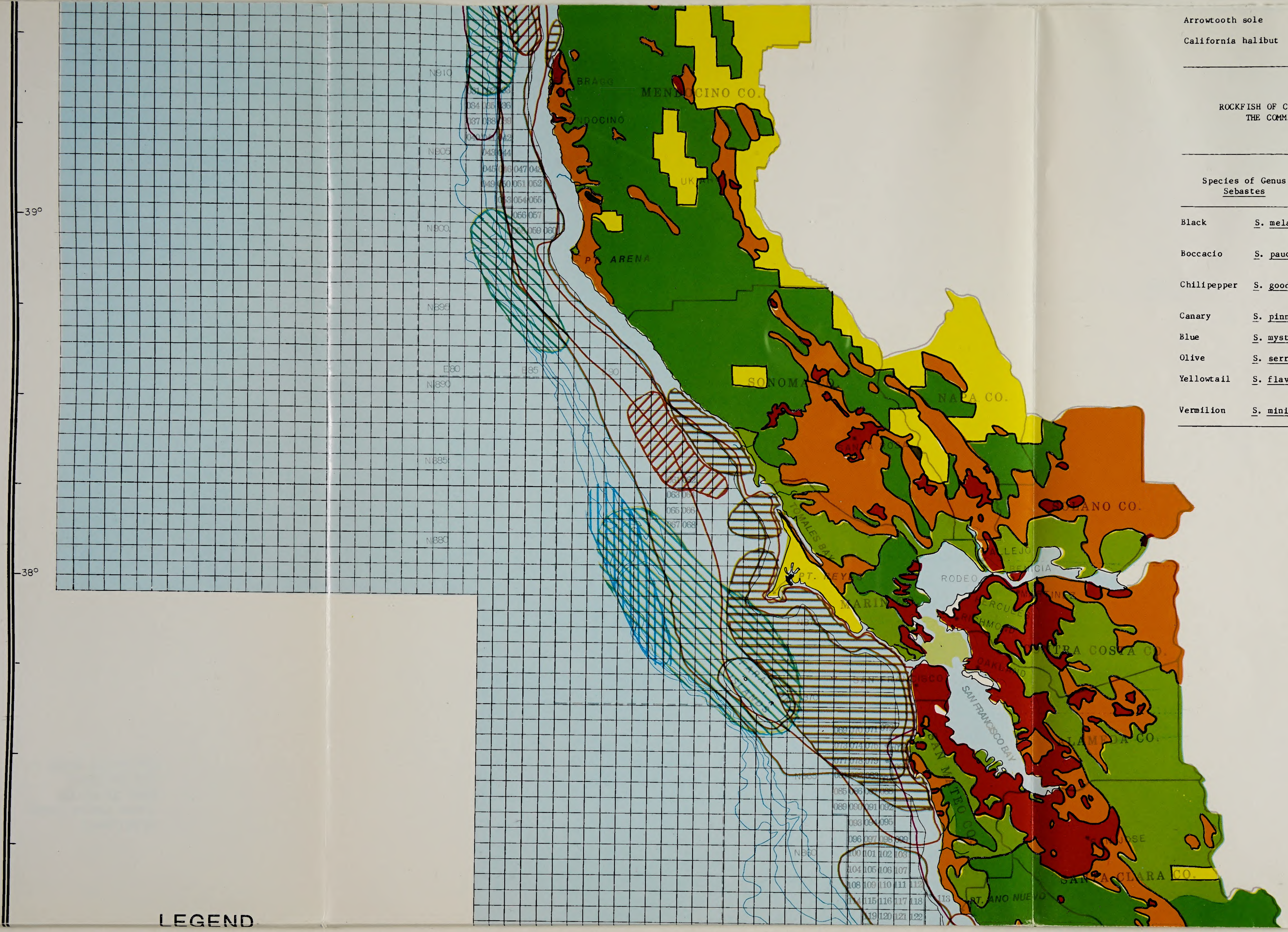
COMMERCIAL FISHERIES; LAND USE

Visual No. 3

TABLE 1

RANGE AND FISHING AREAS OF COMMERCIAL FLATFISH

Species	Range	Main Fishing Areas
Dover sole	Baja Calif. - Bering Sea	Eureka, Fort Bragg, San Francisco area, Monterey
English sole	S. Calif. - Alaska	Eureka, Fort Bragg, San Francisco area, Monterey
Petrale sole	Baja Calif. - Alaska	Fort Bragg, Eureka, Crescent City
Rex sole	Santa Barbara - Alaska	Monterey, San Francisco area
Pacific sandab	S. Calif. - Alaska	



Arrowtooth sole	N. Calif. - Alaska	Eureka to Monterey
California halibut	Baja Calif. - Washington	Morro, Monterey, San Francisco Bay

TABLE 2

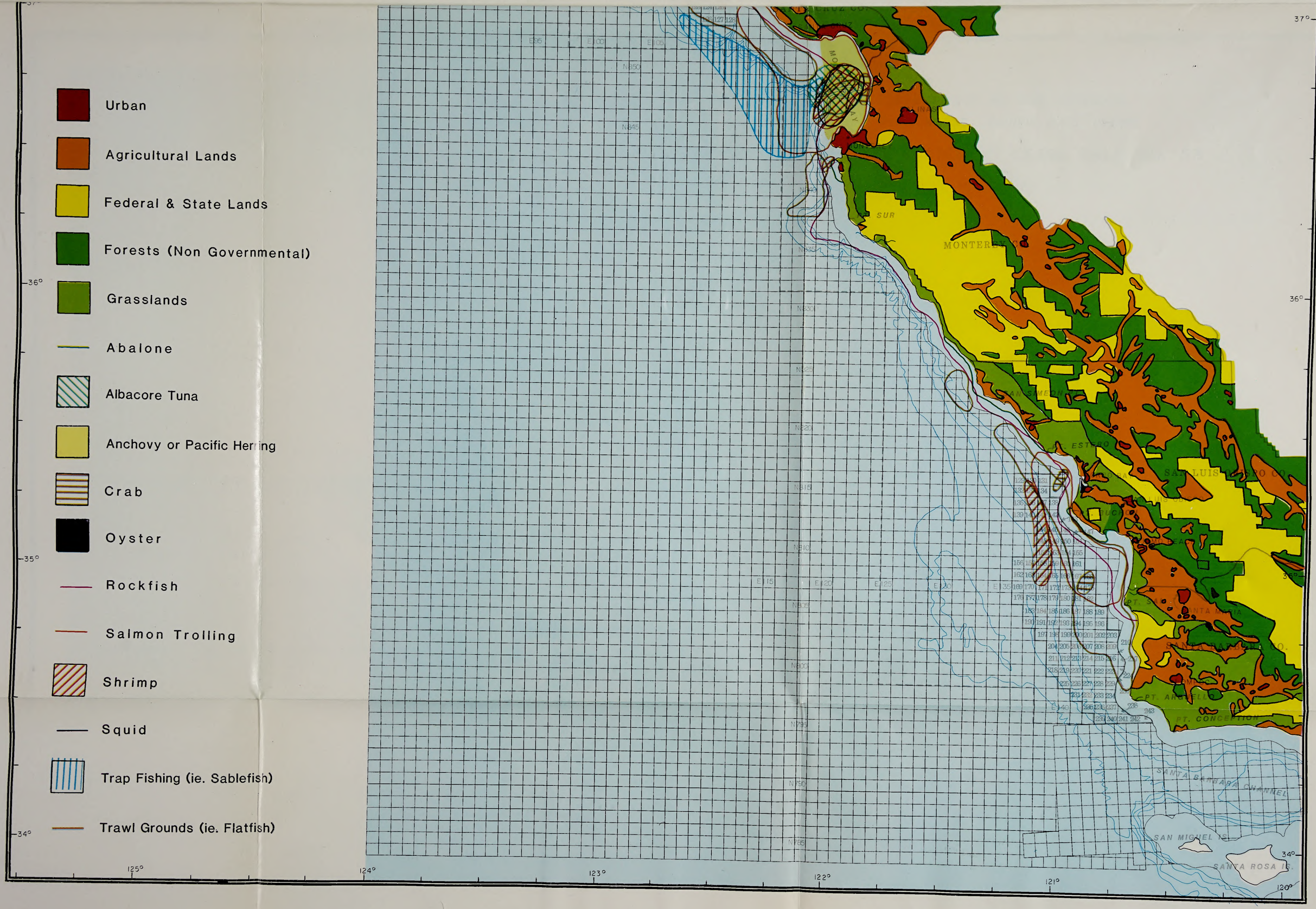
ROCKFISH OF COMMERCIAL IMPORTANCE - WHERE AND HOW TAKEN IN THE COMMERCIAL FISHERY (MILLER AND HARDWICK 1973)

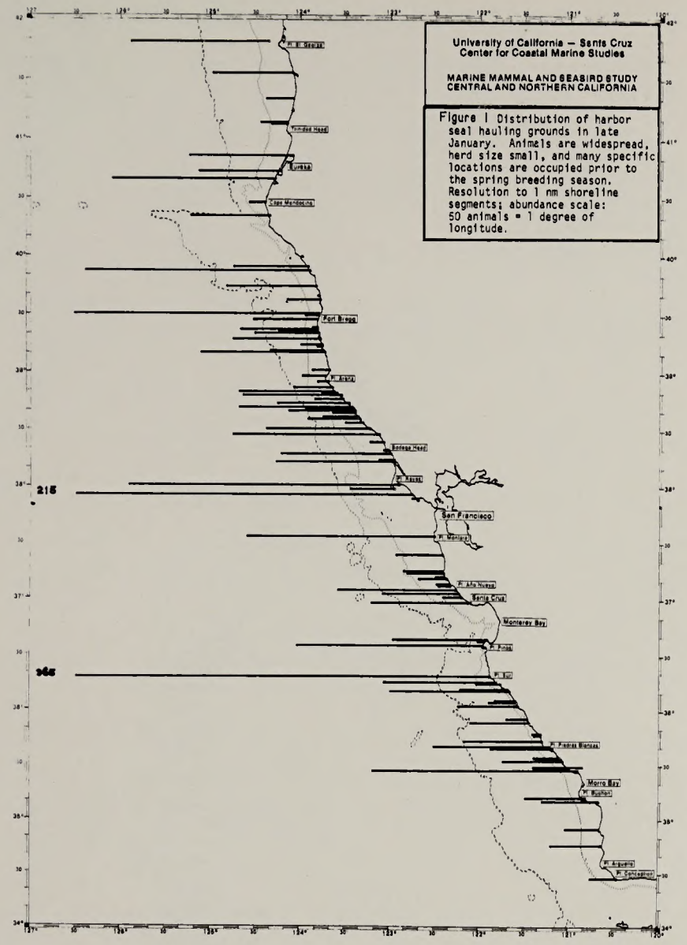
Species of Genus *Sebastes*		Where Most Caught in California	How Caught	Range in Depth Where Numerous
Black	*S. melanops*	North	Long line	Shallow & deep reefs
Boccacio	*S. paucispinis*	Central	Long line, trawl	Below 40 fathoms
Chilipepper	*S. goodei*	Central	Long line, trawl	80-170 fathoms
Canary	*S. pinniger*	North	Trawl	1-80 fathoms
Blue	*S. mystinus*	Central	Gill net	1-50 fathoms
Olive	*S. serranoides*		Gill net	1-80 fathoms
Yellowtail	*S. flavidus*		Gill net, trawl	1-80 fathoms
Vermilion	*S. miniatus*		Long line	20-110 fathoms

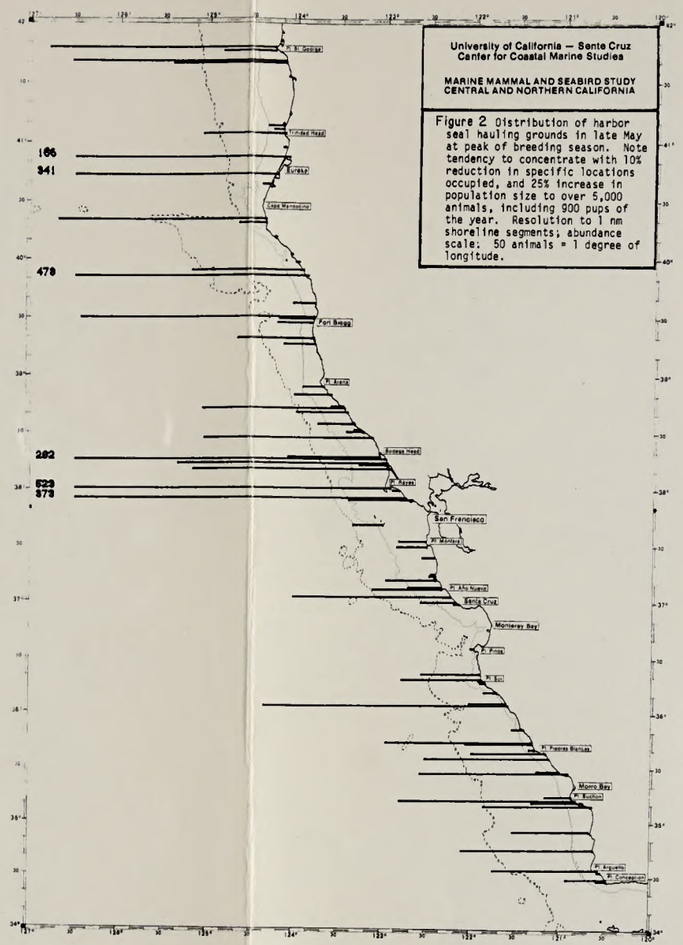
39°

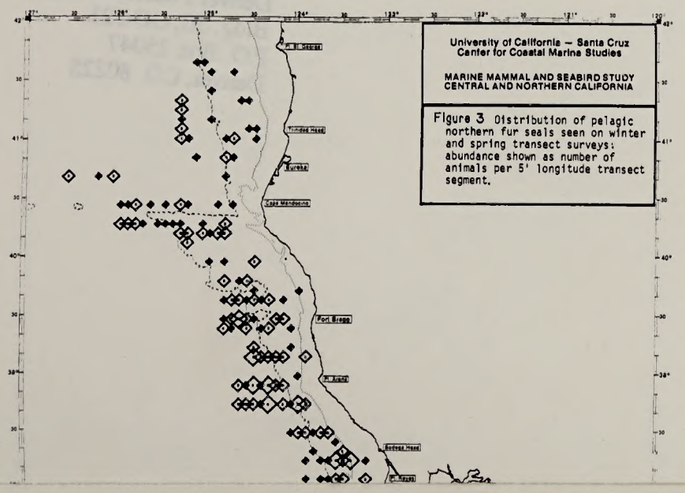
38°

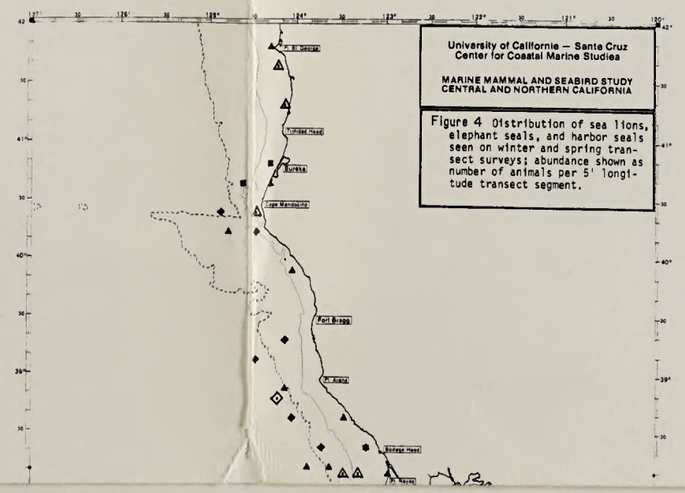
- Urban
- Agricultural Lands
- Federal & State Lands
- Forests (Non Governmental)
- Grasslands
- Abalone
- Albacore Tuna
- Anchovy or Pacific Herring
- Crab
- Oyster
- Rockfish
- Salmon Trolling
- Shrimp
- Squid
- Trap Fishing (ie. Sablefish)
- Trawl Grounds (ie. Flatfish)











ENVIRONMENTAL IMPACT STATEMENT

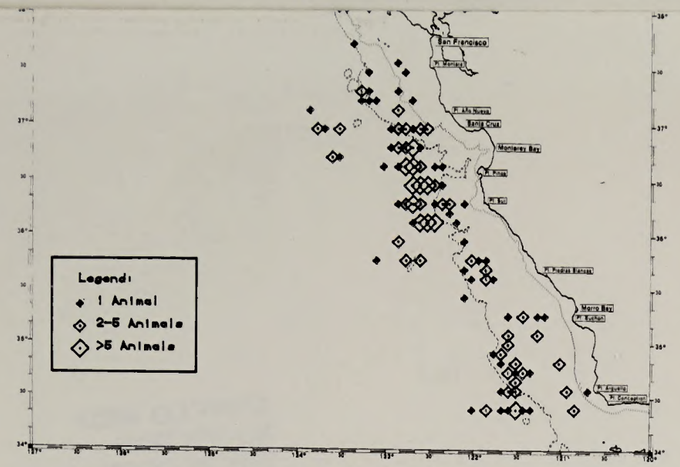
LEASE SALE No. 53

OFFSHORE CENTRAL AND NORTHERN CALIFORNIA

VISUAL ERRATA SHEET No. 3

MARINE BIRDS AND MAMMALS

Source: Figures 5, 6, & 7, U.S. Fish & Wildlife Service, 1980.



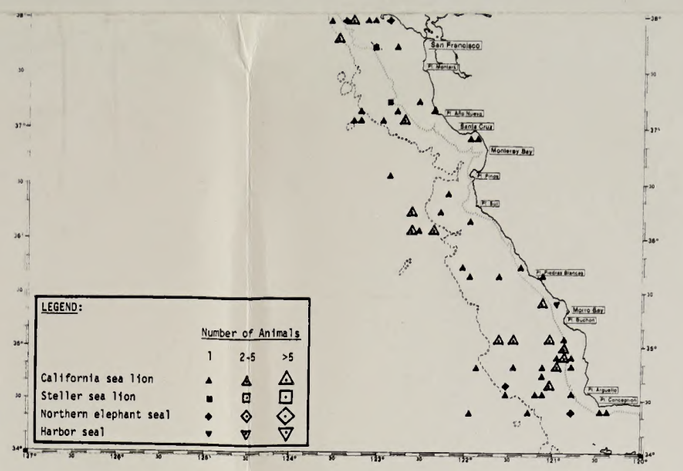


Figure 5 Proportion of breeding seabirds along the California coast. Circle size is directly proportional to number of birds.

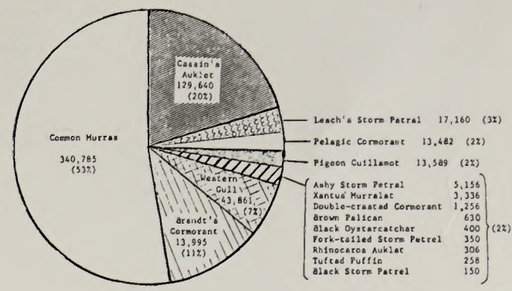


Figure 6 Total estimated populations and percentage of California breeding seabirds.

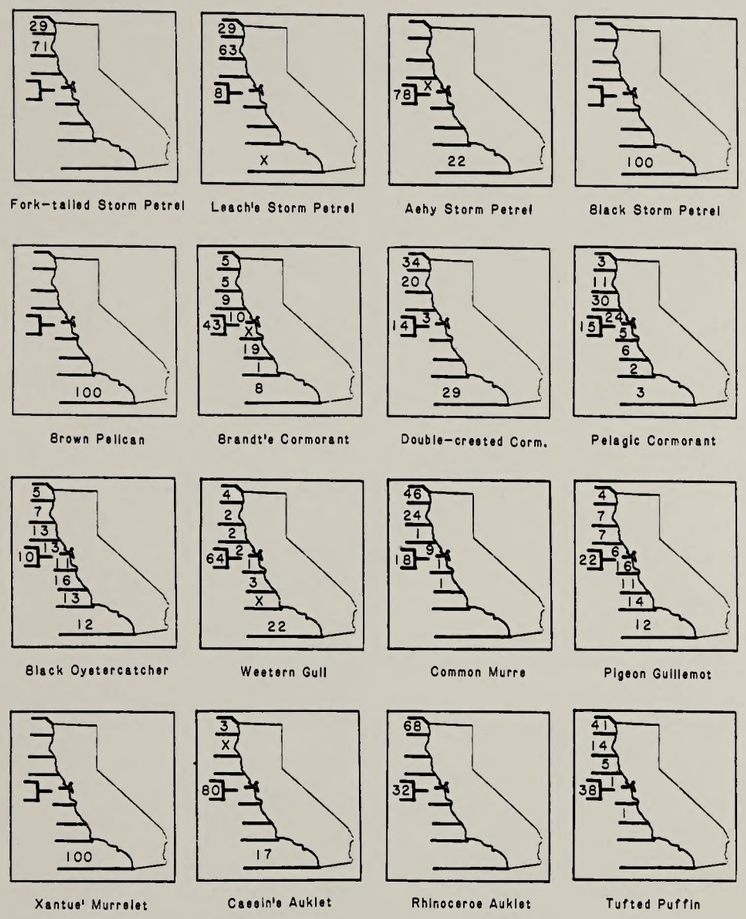
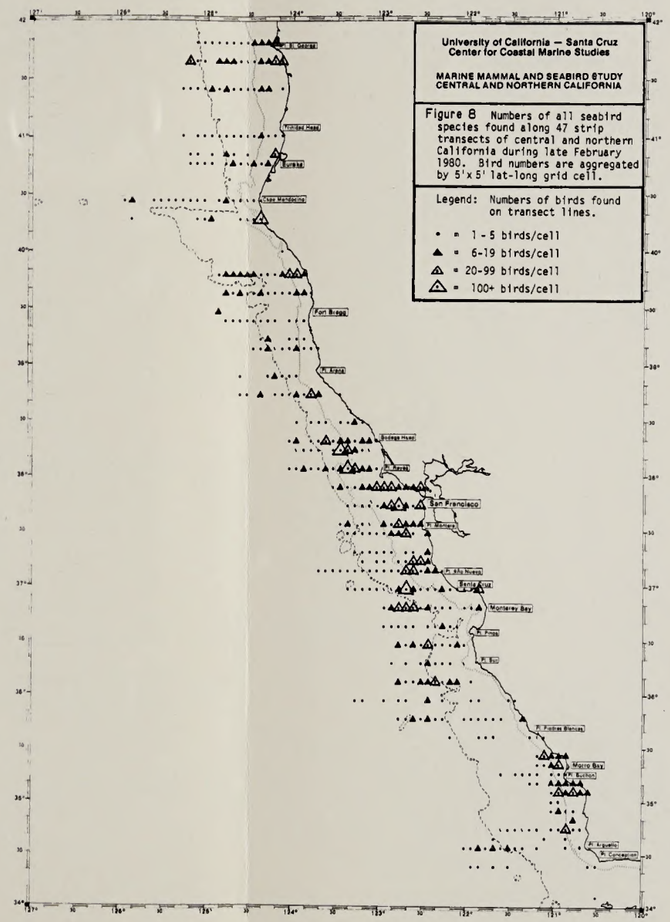
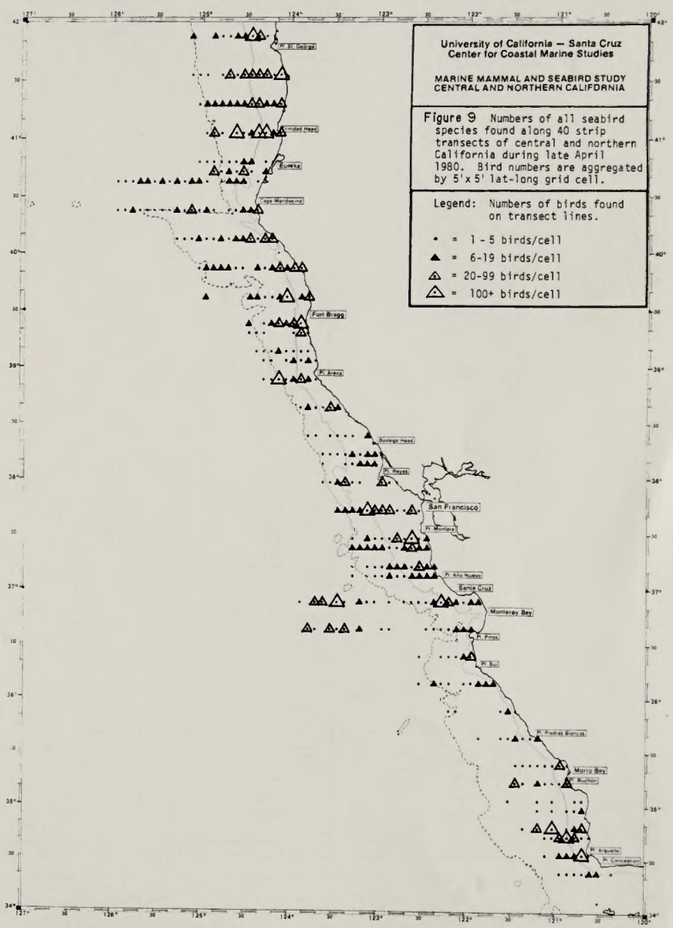


Figure 7 Percentages of California population for nine zones of the California coast by Species.





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5 0 5 10 15 20 25 30 KILOMETERS

5 0 5 10 15 20 STATUTE MILES

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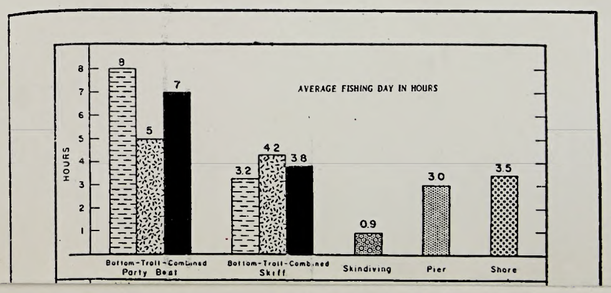
SPORTFISHING

Visual No. 4



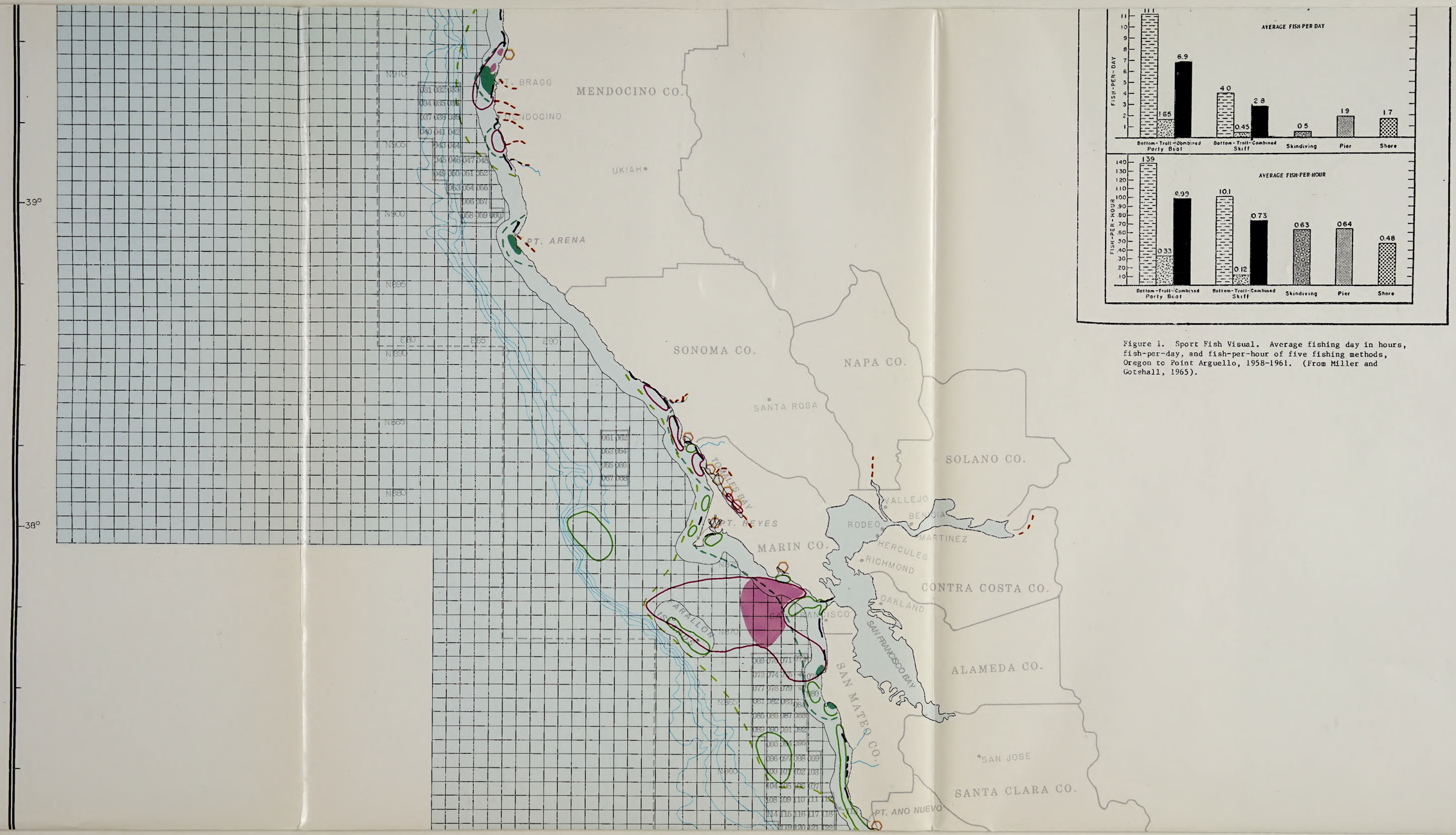


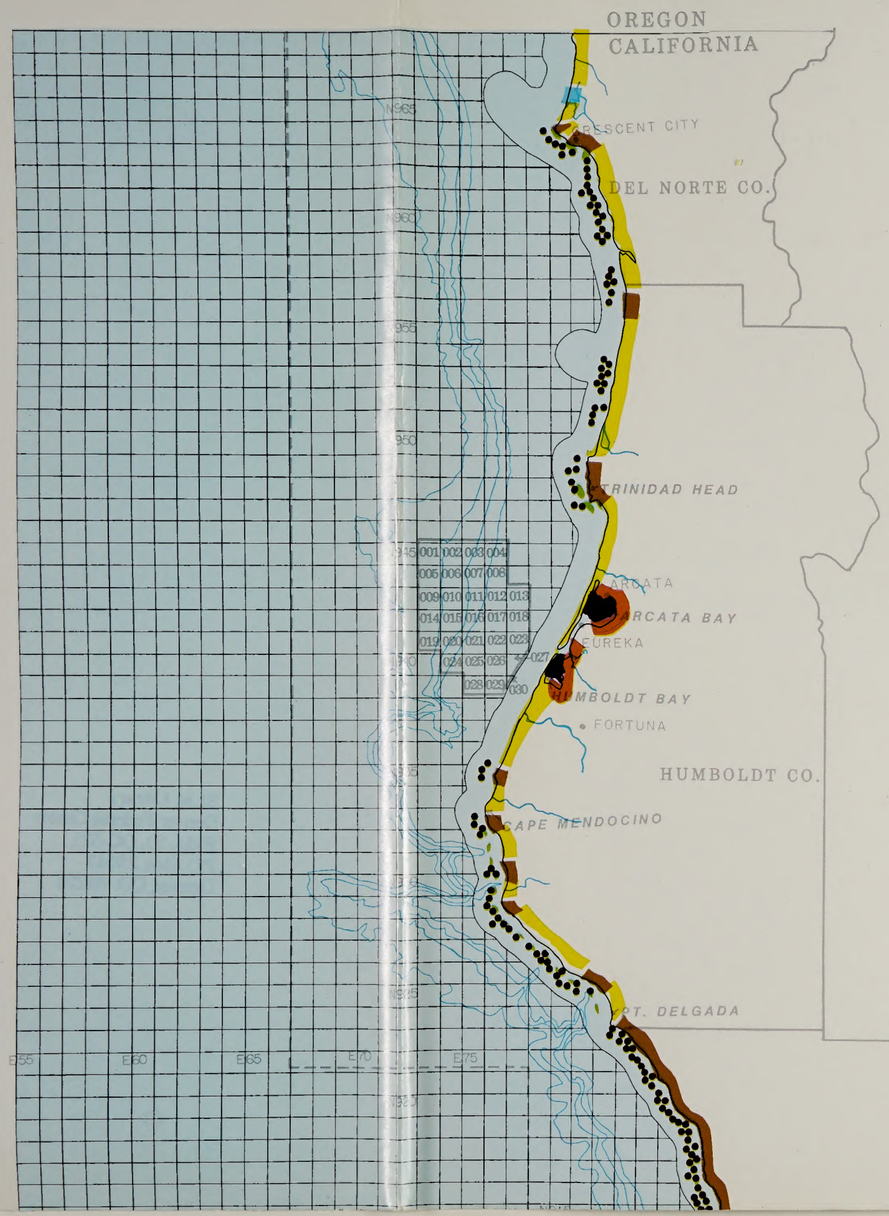
Figure 1. Sport Fish Visual. Average fishing day in hours, fish-per-day, and fish-per-hour of five fishing methods, Oregon to Point Arguello, 1958-1961. (From Miller and Gotshall, 1965).

LEGEND

- Clam Digging
- General Salmon Trolling Areas
- Prime Salmon Fishing Areas
- Salmon/Steelhead Streams
- Party Boat Fishing Areas
- General Party Boat Limits
- Skiff Fishing Areas
- General Skiff Limits
- Shoreline Fishing Areas

SANTA CRUZ CO.
SANTA CRUZ
SALINAS
MONTEREY
PT. SUR
MONTEREY CO.
SAN SIMEON PT.
PT. ESTERO
MORRO BAY
SAN LUIS OBISPO CO.
SAN LUIS OBISPO
PT. BUCHON
PISMO BEACH
PT. SAL
SANTA MARIA
SANTA BARBARA CO.
LOMPOC
PT. ARGUELLO
PT. CONCEPTION
SANTA BARBARA CHANNEL
SAN MIGUEL IS.
SANTA ROSA IS.

37°
36°
35°
34°
125°
124°
123°
122°
121°
120°



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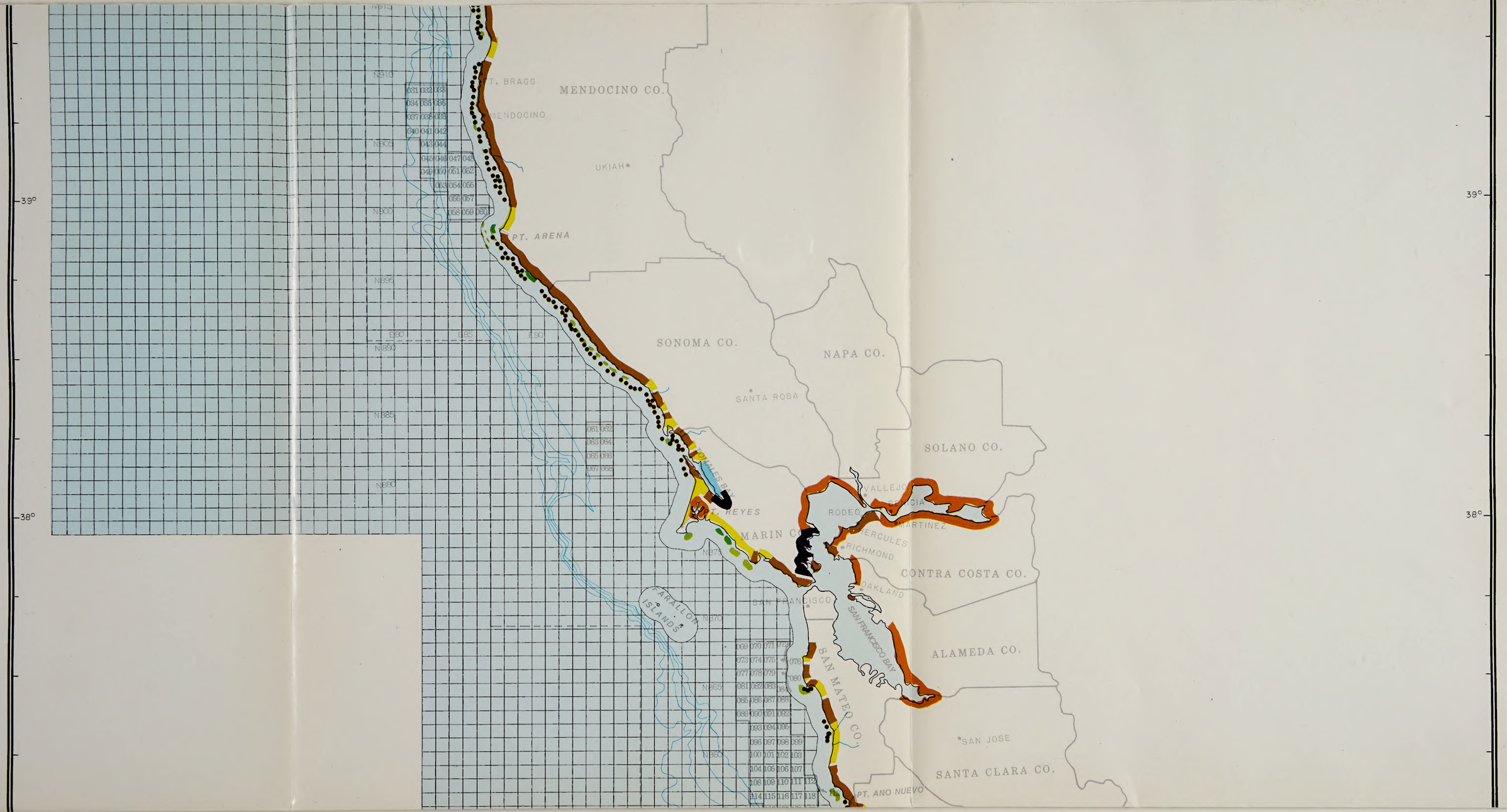
5 0 5 10 15 20 STATUTE MILES

KELP; CORAL; SHORELINE TYPES

Visual No. 5


MENDOCINO CO.
PT. BRAGG
MENDOCINO
UKIAH
PT. ARENA
SONOMA CO.
NAPA CO.
SANTA ROSA
SOLANO CO.
VALLEJO
MARTINEZ
RODEO
HERCULES
RICHMOND
CONTRA COSTA CO.
OAKLAND
SAN FRANCISCO
SAN FRANCISCO BAY
ALAMEDA CO.
SAN MATEO CO.
SAN JOSE
SANTA CLARA CO.
PT. ANO NUEVO
FARALLON ISLANDS
39°
38°

LEGEND

- Macrocystis (Giant Kelp)
- Nereocystis (Bull Kelp)
- Allopora Californica (Coral)
- Paragorgia Arborea (Coral)
- Boulders
- Marsh
- Mud Flats
- Rocky Shore
- Sandy Beach
- Stacks

SANTA CRUZ CO.
SANTA CRUZ
MONTEREY BAY
SALINAS
MONTEREY
PT. SUR
MONTEREY CO.
SAN SIMEON PT.
PT. ESTERO
MORRO BAY
SAN LUIS OBISPO CO.
SAN LUIS OBISPO
PT. BUCHON
PISMO BEACH
PT. SAL
SANTA MARIA
SANTA BARBARA CO.
LOMPOC
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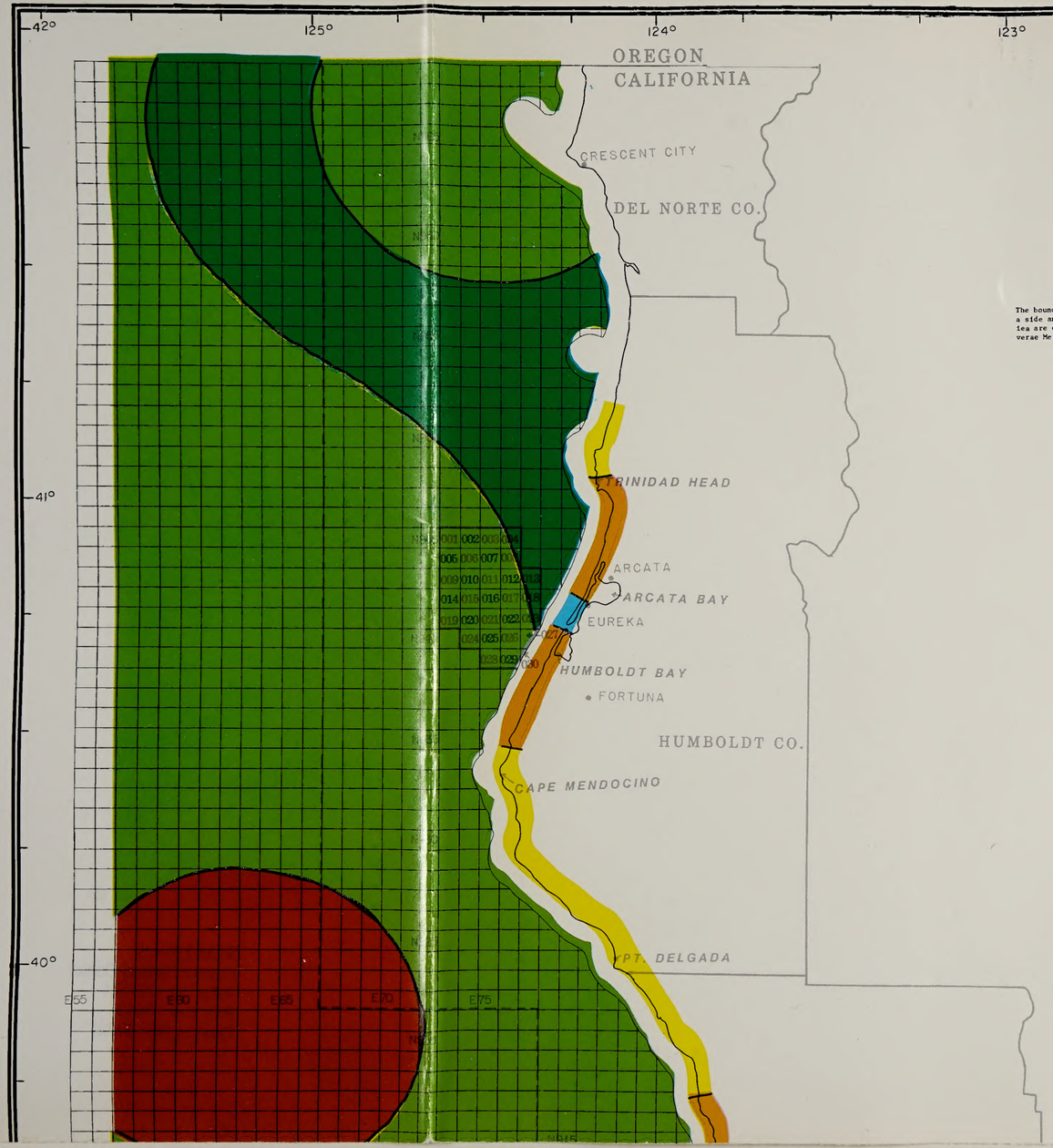
SANTA BARBARA CHANNEL
SAN MIGUEL IS.
SANTA ROSA I.

37°
36°
35°
34°
125°
124°
123°
122°
121°
120°



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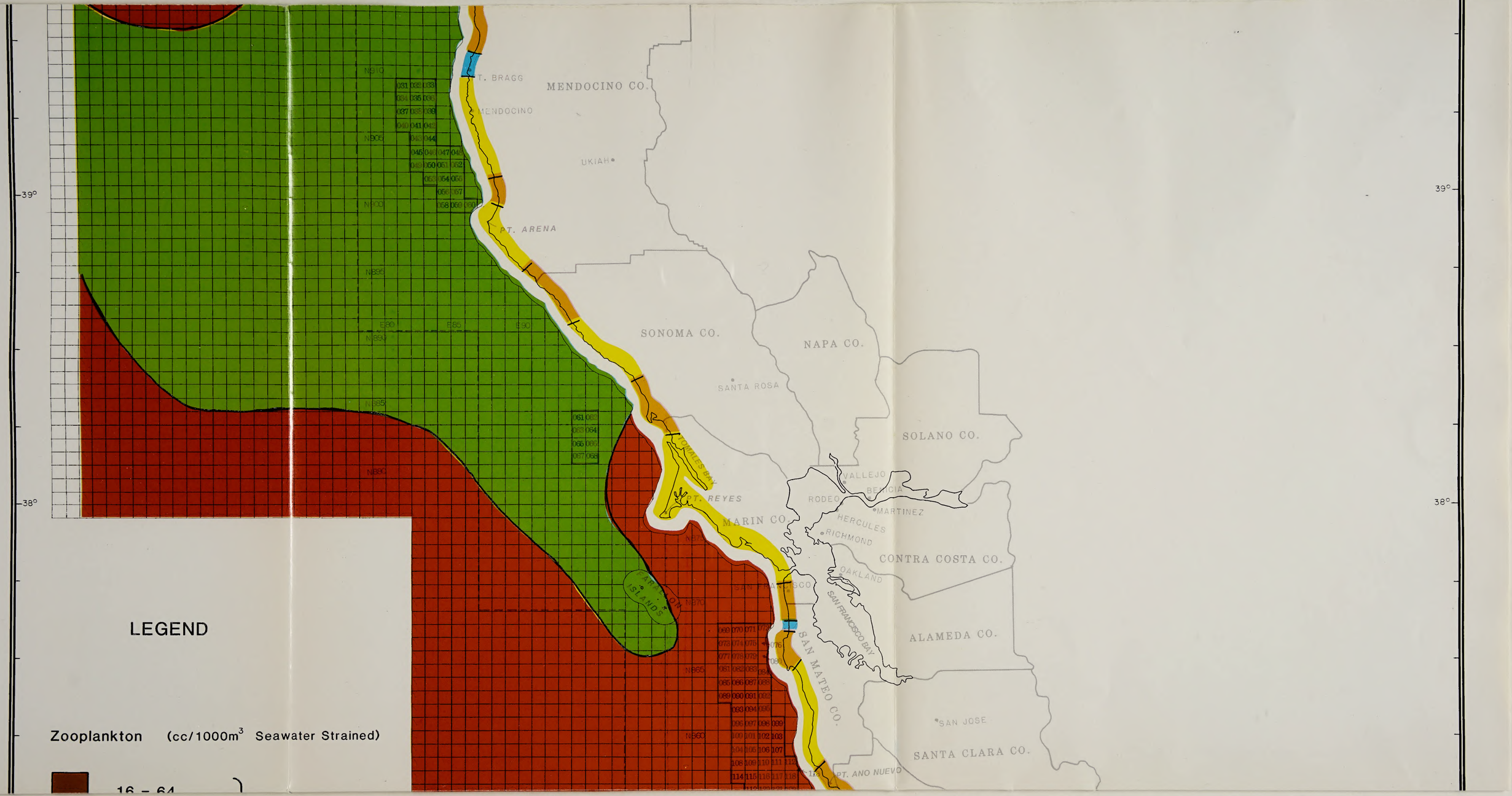
5 0 5 10 15 20 STATUTE MILES

ZOOPLANKTON; VISUAL RESOURCE CATEGORIES

Visual No. 6


MENDOCINO CO.
FT. BRAGG
MENDOCINO
UKIAH
PT. ARENA
SONOMA CO.
SANTA ROSA
NAPA CO.
SOLANO CO.
VALLEJO
BENICIA
MARTINEZ
RODEO
HERCULES
RICHMOND
TOMALES BAY
PT. REYES
MARIN CO.
FARALLON ISLANDS
SAN FRANCISCO
OAKLAND
SAN FRANCISCO BAY
CONTRA COSTA CO.
ALAMEDA CO.
SAN MATEO CO.
SAN JOSE
SANTA CLARA CO.
PT. ANO NUEVO
39°
38°
LEGEND
Zooplankton (cc/1000m3 Seawater Strained)
16 - 64

64 - 256

256 - 1024

1024 - 4096

Summer Months

Visual Resources

Class A

Class B

Class C

SANTA CRUZ CO.

MONTEREY BAY

SALINAS

MONTEREY

PT. SUR

MONTEREY CO.

SAN SIMEON PT.

ESTERO

MORRO BAY

SAN LUIS OBISPO CO.

SAN LUIS OBISPO

PT. BUCHON

PISMO BEACH

PT. SAL

SANTA MARIA

SANTA BARBARA CO.

LOMPOC

PT. ARGUELLO

PT. CONCEPTION

SANTA BARBARA CHANNEL

SAN MIGUEL

SANTA ROSA IS.

37°

36°

35°

34°

125°

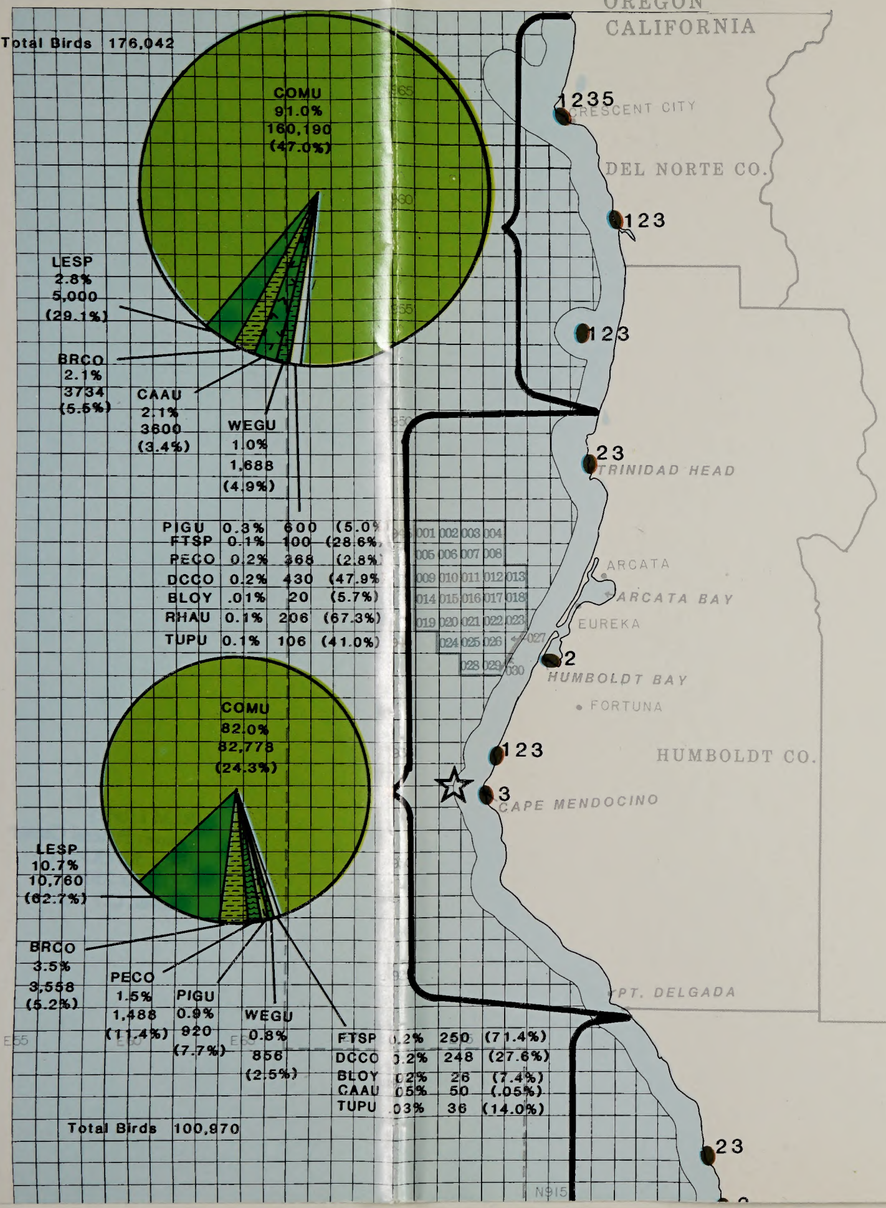
124°

123°

122°

121°

120°



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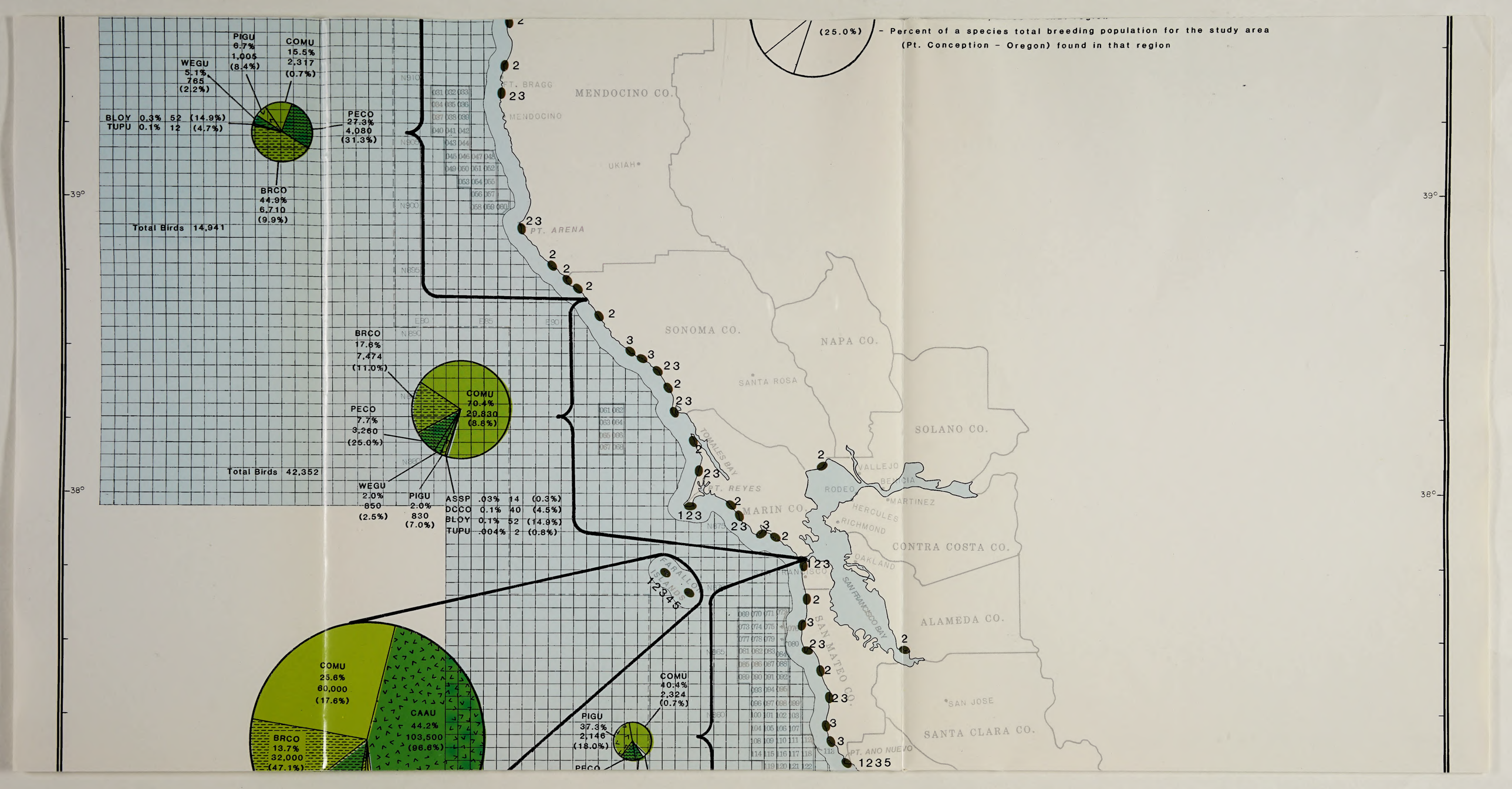
MARINE BIRDS AND MAMMALS

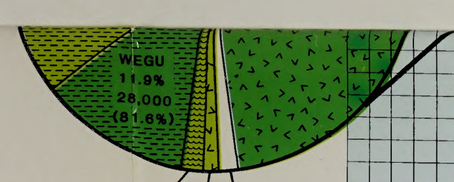
Visual No. 7

COMU - Species Abbreviation

60.0% - Percent of a regions total breeding birds comprised by that species

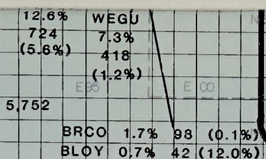
1,000 - Population of a species in that region


(25.0%) - Percent of a species total breeding population for the study area (Pt. Conception - Oregon) found in that region
PIGU 6.7% 1,005 (8.4%)
COMU 15.5% 2,317 (0.7%)
WEGU 5.1% 765 (2.2%)
BLOY 0.3% 52 (14.9%)
TUPU 0.1% 12 (4.7%)
PECO 27.3% 4,080 (31.3%)
BRCO 44.9% 6,710 (9.9%)
Total Birds 14,941
BRCO 17.6% 7,474 (11.0%)
COMU 70.4% 29,830 (8.8%)
PECO 7.7% 3,260 (25.0%)
WEGU 2.0% 850 (2.5%)
PIGU 2.0% 830 (7.0%)
ASSP .03% 14 (0.3%)
DCCO 0.1% 40 (4.5%)
BLOY 0.1% 52 (14.9%)
TUPU .004% 2 (0.8%)
Total Birds 42,352
COMU 25.6% 60,000 (17.6%)
CAAU 44.2% 103,500 (96.6%)
BRCO 13.7% 32,000 (47.1%)
COMU 40.4% 2,324 (0.7%)
PIGU 37.3% 2,146 (18.0%)
MENDOCINO CO.
ST. BRAGG
MENDOCINO
UKIAH
PT. ARENA
SONOMA CO.
SANTA ROSA
NAPA CO.
SOLANO CO.
VALLEJO
BENICIA
RODEO
MARTINEZ
HERCULES
RICHMOND
MARIN CO.
ST. REYES
TOMALES BAY
FARALLON ISLANDS
SAN FRANCISCO BAY
OAKLAND
CONTRA COSTA CO.
ALAMEDA CO.
SAN MATEO CO.
SAN JOSE
SANTA CLARA CO.
PT. ANO NUEVO
39°
38°



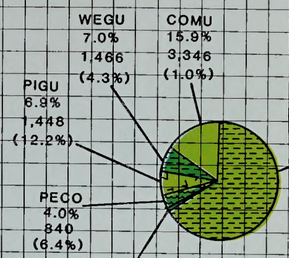
Total Birds 234,320

LESP	0.6%	1,400	(8.2%)
DCCO	0.1%	180	(20.0%)
PECO	0.9%	2,000	(15.3%)
BLOY	.02%	40	(11.4%)
RHAU	.04%	100	(32.7%)
TUPU	.04%	100	(38.8%)



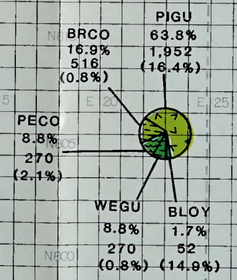
Total Birds 5,752

BRCO	1.7%	98	(0.1%)
BLOY	0.7%	42	(12.0%)



BLOY	0.3%	66	(18.9%)
TUPU	.01%	2	(0.8%)

Total Birds 21,014



Total Birds 3,060

LEGEND

MARINE BIRDS

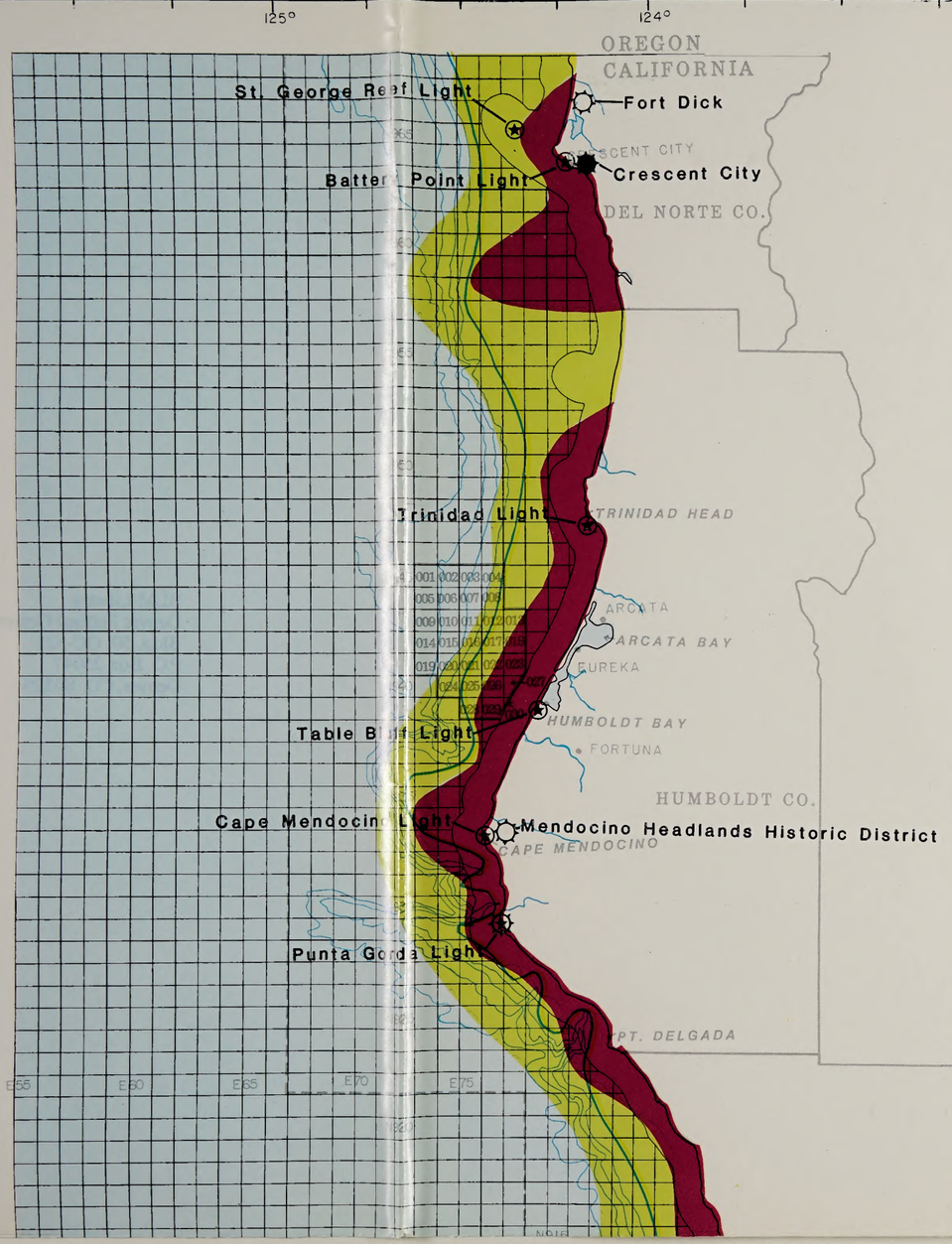
- ASSP – Ashy Storm Petrel
- BLOY – Black Oystercatcher
- BRCO – Brandt's Cormorant
- CAAU – Cassin's Auklet
- COMU – Common Murre
- DCCO – Double-crested Cormorant
- FTSP – Fork-tailed Storm Petrel
- LESP – Leach's Storm Petrel
- PECO – Pelagic Cormorant
- PIGU – Pigeon Guillemot
- RHAU – Rhinoceros Auklet
- TUPU – Tufted Puffin
- WEGU – Western Gull

MARINE MAMMALS

- Sea Otter Range
- Pinniped Haul-out &/or Breeding Area
- 1 California Sea Lion
- 2 Harbor Seal
- 3 Steller Sea Lion
- 4 Northern Fur Seal
- 5 Northern Elephant Seal
- ☆ Sea Otter Sighting

SANTA CRUZ CO.
SANTA CRUZ
MONTEREY BAY
SALINAS
MONTEREY
PT. SUR
MONTEREY CO.
SAN SIMEON PT.
PT. ESTERO
MORRO BAY
SAN LUIS OBISPO CO.
SAN LUIS OBISPO
PT. BUCHON
PISMO BEACH
PT. SAL
SANTA MARIA
SANTA BARBARA CO.
LOMPOC
PT. ARGUELLO
PT. CONCEPTION
SANTA BARBARA CHANNEL
SAN MIGUEL IS.
SANTA ROSA IS.

37°
36°
35°
34°
125°
124°
123°
122°
121°
120°



UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT PACIFIC O.C.S. OFFICE

ENVIRONMENTAL IMPACT STATEMENT LEASE SALE NO. 53

OFFSHORE CENTRAL AND NORTHERN CALIFORNIA

The boundaries of the regular blocks are 4,800 international meters on a side and contain 2,304 hectares (5,693 acres). The regular boundaries are defined in terms of X and Y coordinates of the Universal Transverse Mercator Grid System based on the Clarke Spheroid of 1866.

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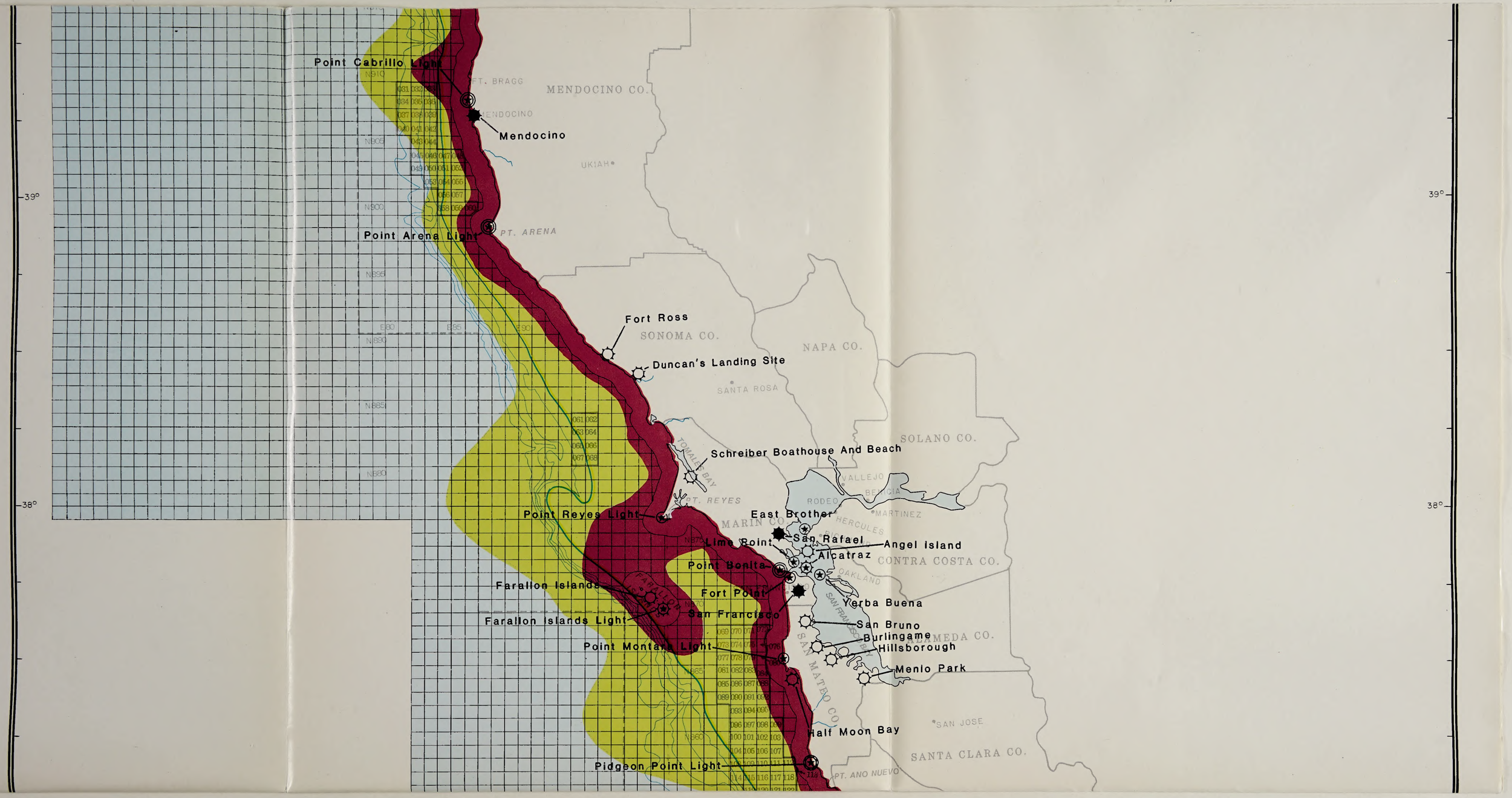
5 0 5 10 NAUTICAL MILES

5 0 5 10 15 20 25 30 KILOMETERS

5 0 5 10 15 20 STATUTE MILES

CULTURAL RESOURCES

Visual No. 8


Point Cabrillo Light
Mendocino
Point Arena Light
Fort Ross
Duncan's Landing Site
Schreiber Boathouse And Beach
Point Reyes Light
East Brother
San Rafael
Angel Island
Lime Point
Alcatraz
Point Bonita
Fort Point
Farallon Islands
Farallon Islands Light
San Francisco
Yerba Buena
San Bruno
Burlingame
Hillsborough
Point Montara Light
Menlo Park
Half Moon Bay
Pidgeon Point Light
MENDOCINO CO.
SONOMA CO.
NAPA CO.
SOLANO CO.
MARIN CO.
CONTRA COSTA CO.
ALAMEDA CO.
SANTA CLARA CO.
FT. BRAGG
UKIAH
PT. ARENA
SANTA ROSA
VALLEJO
MARTINEZ
OAKLAND
SAN JOSE
PT. REYES
PT. ANO NUEVO
39°
38°

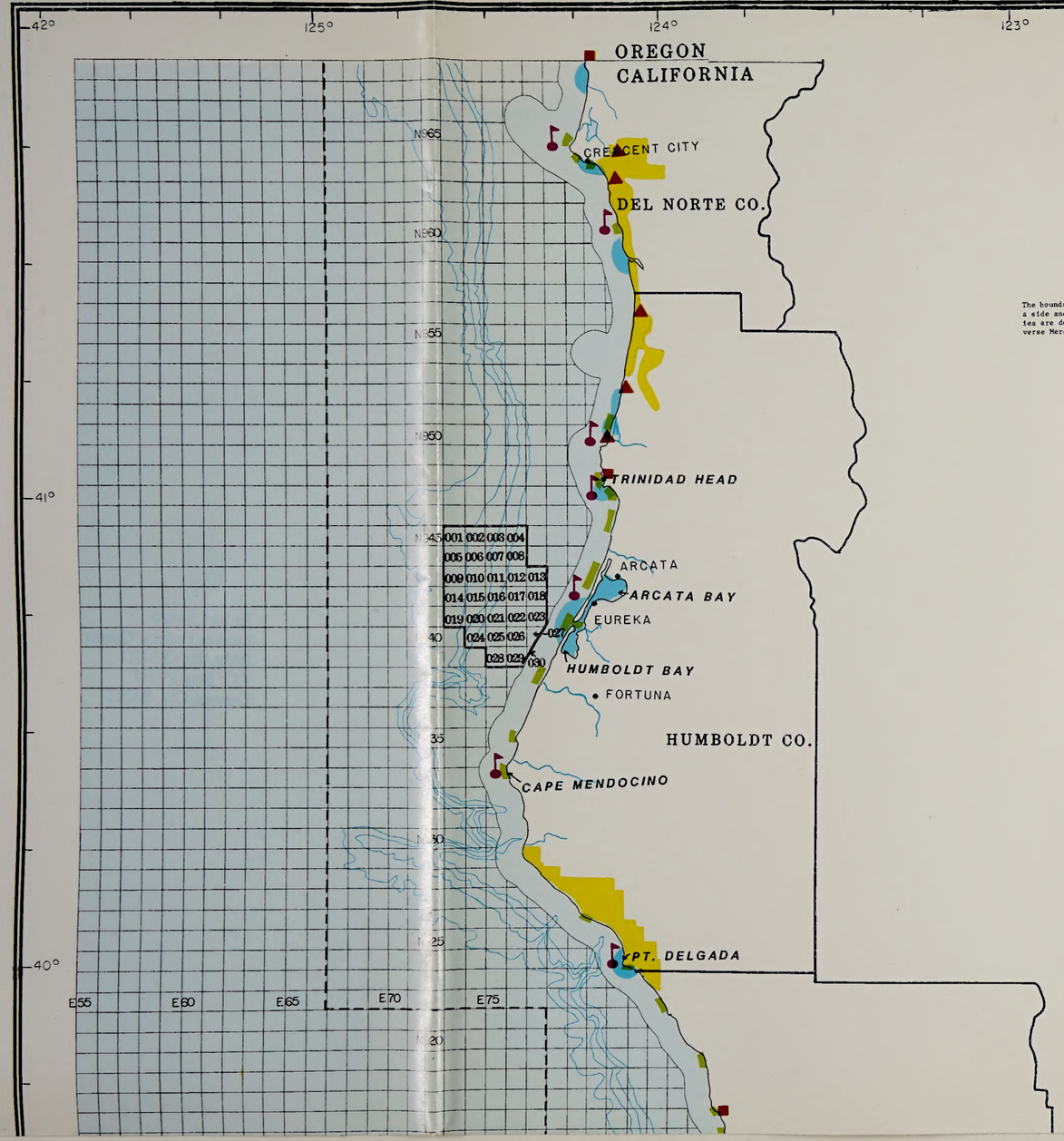
LEGEND

- Shipwrecks Zone 1
- Shipwrecks Zone 2
- Potentially Sensitive for Aboriginal Remains (Depth 150m. or less)
- Historic Lighthouse
- Historic Lighthouse (National Register Historic Site)
- Historic Lighthouse (California Historic Site)
- Historic Lighthouse (National & California Historic Site)
- National Register Historic Site
- Multiple Historic Sites

Zone 1 : Recorded Shipwrecks Within 10 Nautical Miles

Zone 2 : Cluster of at Least Three(3) Shipwrecks Within 5 Nautical Miles or Single Shipwreck Within 1 Nautical Mile

Prehistoric Sites Omitted For Protection



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5 0 5 10 15 20 STATUTE MILES

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RECREATION

Visual No. 9


N915
N910
N905
N900
N895
N890
N885
N880
N875
N870
N865
N860
E80
E85
E90
039°
038°
FT. BRAGG
MENDOCINO
MENDOCINO CO.
UKIAH
PT. ARENA
SONOMA CO.
SANTA ROSA
NAPA CO.
SOLANO CO.
VALLEJO
BENICIA
RODEO
MARTINEZ
HERCULES
RICHMOND
CONTRA COSTA CO.
OAKLAND
SAN FRANCISCO
SAN FRANCISCO BAY
ALAMEDA CO.
SAN MATEO CO.
SAN JOSE
SANTA CLARA CO.
PT. ANO NUEVO
TOMALES BAY
PT. REYES
MARIN CO.
FARALLON ISLANDS
031 032 033
034 035 036
037 038 039
040 041 042
043 044
045 046 047 048
049 050 051 052
053 054 055
056 057
058 059 060
061 062
063 064
065 066
067 068
069 070 071 072
073 074 075 076
077 078 079 080
081 082 083 084
085 086 087 088
089 090 091 092
093 094 095
096 097 098 099
100 101 102 103
104 105 106 107
108 109 110 111 112
113 114 115 116 117 118

LEGEND

- Areas of Boating Concentration
- Diving Areas
- Surfing Areas
- Federal Recreational Areas
- State Beaches
- State Parks

SANTA CRUZ CO.
SANTA CRUZ
MONTEREY BAY
SALINAS
MONTEREY
PT. SUR
MONTEREY CO.
SAN SIMEON PT.
PT. ESTERO
MORRO BAY
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SAN LUIS OBISPO
PT. BUCHON
PISMO BEACH
PT. SAL
SANTA MARIA
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LOMPOC
PT. ARGUELLO
PT. CONCEPTION
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SAN MIGUEL IS.
SANTA ROSA IS.

37°
36°
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125°
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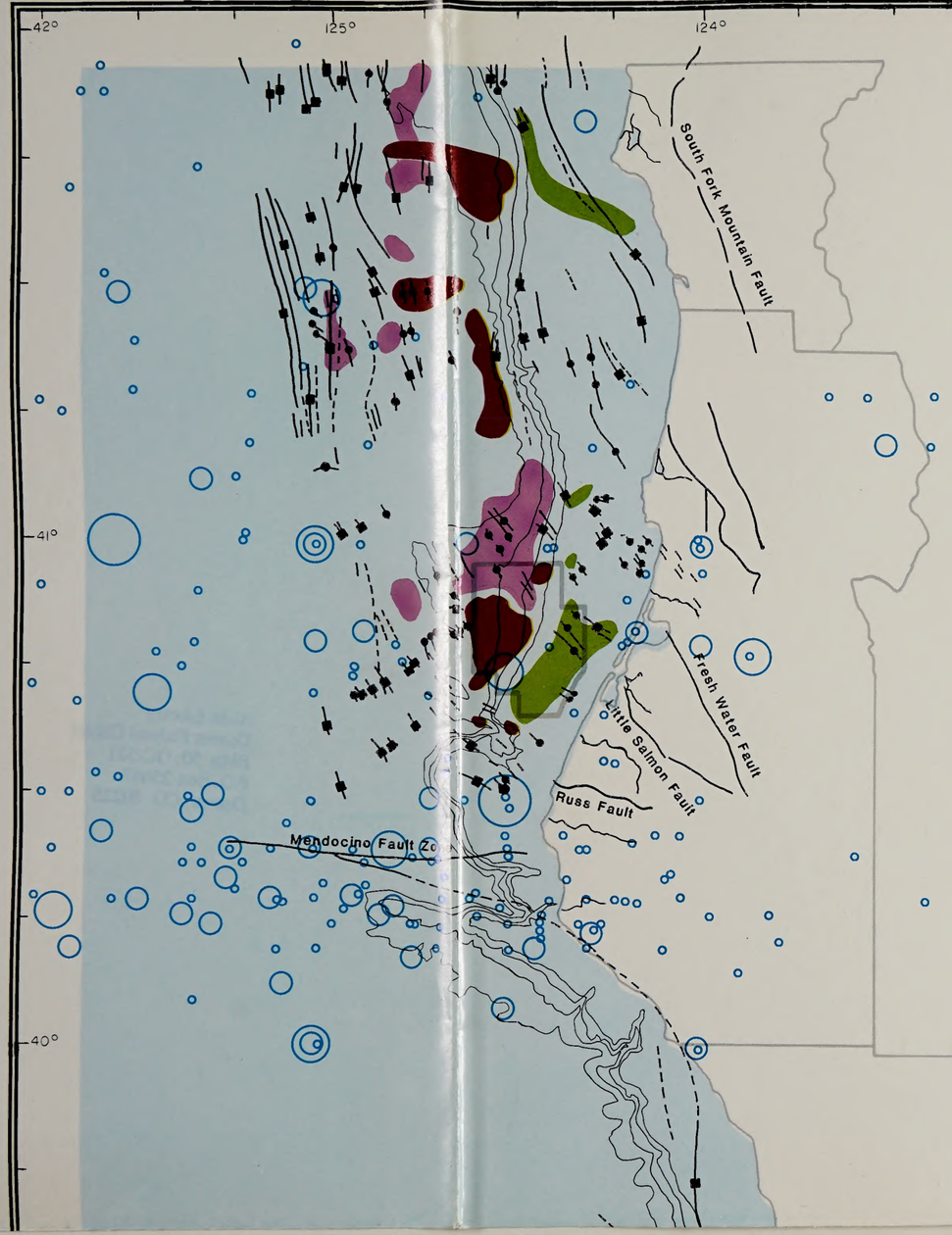
123°
122°
121°
120°



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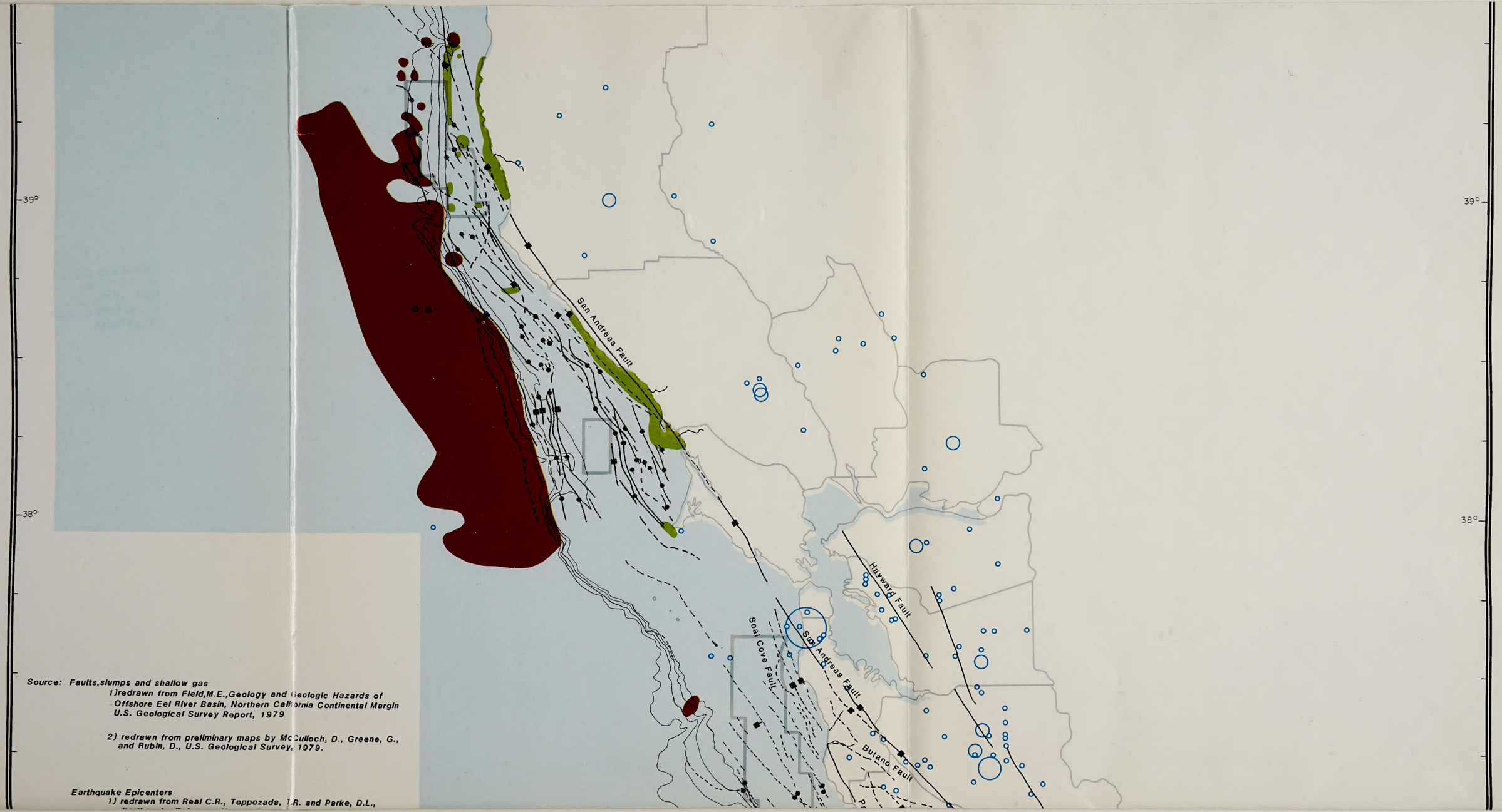
GEOLOGICAL HAZARDS

Visual No. 10



Source: Faults,slumps and shallow gas

1)redrawn from Field,M.E.,Geology and Geologic Hazards of Offshore Eel River Basin, Northern California Continental Margin U.S. Geological Survey Report, 1979

2) redrawn from preliminary maps by McCulloch, D., Greene, G., and Rubin, D., U.S. Geological Survey, 1979.

Earthquake Epicenters

1) redrawn from Real C.R., Toppozada, T.R. and Parke, D.L.,

Earthquake Epicenter Map of California, Map Sheet 39
California Division of Mines and Geology, 1978

LEGEND

Shallow Faulting (Cuts Pleistocene or Holocene Strata)

Intermediate Depth Faulting (Pre-Quaternary in Age)

Deep Older Faulting (Tertiary in Age or Age Cannot be Determined)

Slump

Potential Slump

Shallow Gas

Earthquake Epicenters of Known Intensity (Richter Scale) 1900–1974

- 4.0 – 4.9
- 5.0 – 5.9
- 6.0 – 6.9
- 7.0 – 7.9
- 8.0 or Greater

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GEOLOGY AND MARINE SEDIMENTS

Visual No. 11


KT3 w/ pockets of gravel & sand
T3
K
T3 w/ pockets of shell, gravel,
KT3 coarse sand & sand
39°
38°
LEGEND
Unconsolidated Sediments
G Gravel
CS Coarse Sand

QUATERNARY

- S — Sand, Medium or not defined
- FS — Fine Sand or Very Fine Sand
- M — Mud
- MS — Mud and Sand Mixed
- Sh — Shell and Coral

Rock Units

TERTIARY

Miocene Pliocene

- T1 — Sedimentary and Metamorphic
- T2 — Volcanic

Paleocene Oligocene Eocene

- T3 — Sedimentary and Metamorphic

JURASSIC CRETACEOUS

- K — Sedimentary and Metamorphic
- Kg — Granitic
- JK — Franciscan Formation
- KT3 — Sedimentary and Metamorphic
- R — Undifferentiated Tertiary and Pre-Tertiary Rock

Kg w/ pockets of shell, gravel, sand & coarse sand

K w/ sand, coarse sand & shell

T1 w/ sand

Source: Marine sediments redrawn from Welday E.E. and Williams, J.W., Offshore Surficial Geology of California, California Division of Mines and Geology, 1975

37° 36° 35° 34°

125° 124° 123° 122° 121° 120°